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PHOTO-ELECTRIC TUBES USED IN MAKING AUTOMOBILE VALVES

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Cleveland Editor, The Iron Age

ELECTRONIC control and the rearrangement of equipment for straight-line progression of work have effected new economies in the production of automobile valves at the plant of Thompson Products, Inc., Cleveland.

The use of photo-electric tubes for controlling operations is an outstanding feature of the plant as now arranged. A photo-electric tube is provided for controlling the temperature to which tips of valves are heat-treated electrically in the hardening operation. Electronic control is used also on gathering machines in the forge shop. With this control the machine does not perform its function of gathering the metal that forms the head, the first forging operation, until the end of the piece that is to be gathered is at the proper heat.

Bar stock used in making a common type of valve is received from the mills in 12-ft. lengths, most of the material being ground before it is shipped. Various grades of alloy steel are used, the most common being nickel-chromium and chromium steel for intake valves and chromium-nickel-silicon steel having high heat-resisting qualities for the exhaust valves. The first operation is cutting the bar to length, 10½ in. being the length of piece required for making most of the valves.

The bars are cut hot in automatic cut-off machines. Economies have been effected by the use of special furnaces for preheating bars ranging in size from 21/64 to 29/64 in. in diameter. A furnace, 14 ft. long, is back of each cutting-off machine. A row of gas jets on one side extends the length of the heating chamber.

ELECTRONIC control is among the innovations introduced by Thompson Products, Inc., Cleveland, to effect new economies in the manufacture of automobile valves. It is used in the operation of gathering machines, which gather the metal forming the valve head, and in hardening the tip of the valve stem.

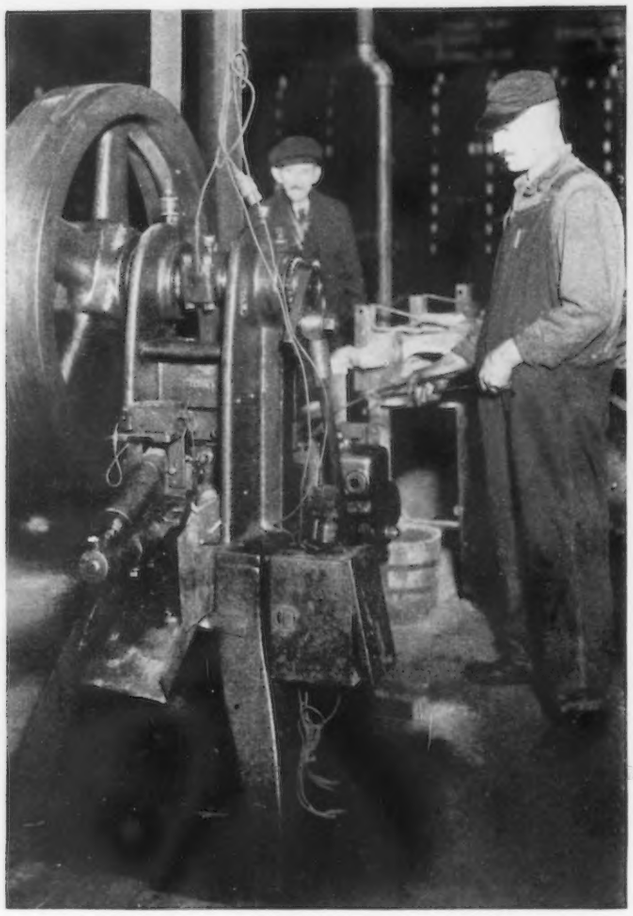
The entire bar is heated in the chamber at one time. A monorail deposits the stock in bundles on a table, from which the bars are fed down a slight incline into the heating chamber through a slot-type opening at the side of the furnace. In the chamber the bars rest side by side on inclined rails. After being brought to the proper temperature, the end of the bar is drawn from the furnace with tongs and delivered into the cut-off machine. The bar then moves along until it is all cut off. As the distance between the machine and the furnace is only about 3 ft., only a small portion of the stock is exposed to the atmosphere, and the time between leaving the furnace and cutting off is so short that the bar retains the necessary heat. When a bar (the one that has been in the furnace the longest) is removed, another is fed into the furnace over the incline and takes its place at the side of those that are already being heated. Usually nine pieces of stock are in the furnace chamber at one time and this gives the proper time sequence for heating. However, the number varies somewhat, depending on the size of stock.

Bar stock previously was heated in box-type furnaces. When that method of heating was followed, the bar did not remain at required temperature long enough to cut up its entire length and it had to be taken back to the furnace for reheating.

The blanks are carried in barrels from the cut-off machine to the forge shop, where they are first ground on a roll grinder, about 0.002 in. of metal being removed to provide a smooth, clean surface on the stem.

Forming the head, which follows, consists in the case of most types of valves of two hot-metal operations—gathering about one-half the metal in the piece into a ball and then hammering the ball into a head with one blow in a header.

The gathering operation is done in a Bartlett-process gathering machine developed in the plant. This is a semi-automatic machine with pneumatic control in which the work is heated electrically. The piece is placed in grooves in a pair of copper pads forming the anodes and providing a sliding contact. One end of the blank is placed against a carriage with screw feed, which moves forward and backward automatically. This pushes the piece forward against a head effecting an electrical contact. As soon as this contact is made the electric eye cuts off momentarily the motor operating the feeding device. The piece quickly attains a red heat, and as soon as it is at the proper temperature for forging the motor again starts up and the feeding de-



SEMI-AUTOMATIC machines in which ends of valve blanks are heated the head of a valve. The use of the electric eye as a means of con

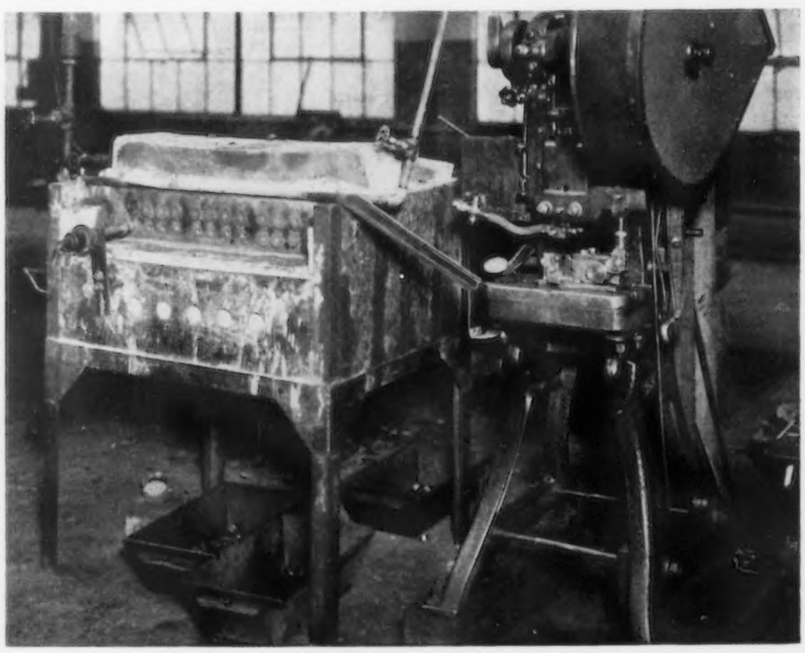
SPECIALLY designed furnaces are used for heating bar stock for automobile valves before cutting off. The man in the foreground is feeding stock from the furnace into an automatic cut-off machine.

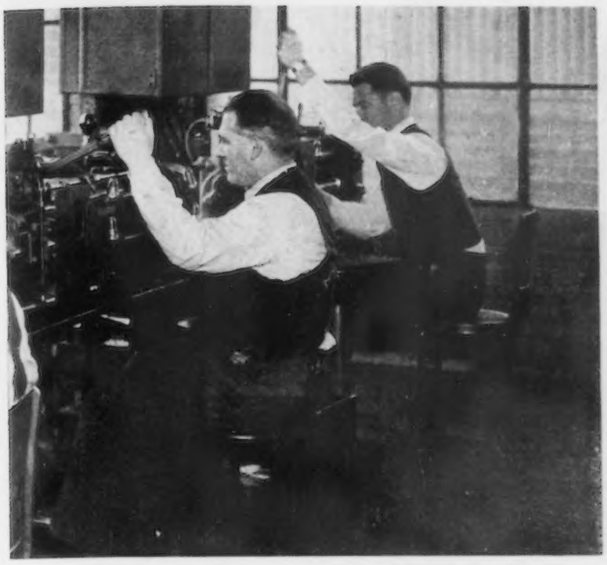
(Below) Labor cost in making keyways in valves has been materially reduced by transferring this operation from the machine shop to the forge shop and hot punching the keyways. The picture shows a special furnace for heating the stem and the adjoining punch press on which the operation is performed.

vice or pusher again functions, sufficient pressure being exerted on the piece against the head to gather up the heated end of the piece in the form of a ball. Then the pressure, which is controlled by adjustable stops, is relieved and the mechanism reverses automatically, the pusher returning to its starting point. By providing automatic control through the electric eye, the danger of having the piece too hot, which would cause it to burn, or too cold, which would cause it to bend under pressure, is avoided. The temperature range is usually from 1900 to 2000 deg. F.

The work of the machine operator is confined largely to feeding the machines. The operator places a piece in the groove of the pad and closes the jaws of the pad with a lever, which holds the pads tightly together when the piece is moving through. After the head is gathered and the machine reverses, the operator raises the lever opening the pads, removes the piece and inserts a new piece. The machines are provided with foot-treadle control and the operator can stop the machine instantly.

The travel of the piece in the machine ranges from 37 to 59 in. a minute, depending on the grade of steel. Each machine will gather about 400 pieces an hour, the number depending on the grade of steel and length of valve. Usually 5 in. of the stock is gathered up in a ball, this furnishing the amount of material required for the finished valve head, although in some types of valves as much as 6⅝ in. of the material is thus gathered up. The remaining material becomes the valve stem. The gathering machines are arranged in four groups of six machines each. Five machines are operated at a time, the sixth machine being provided as a spare.



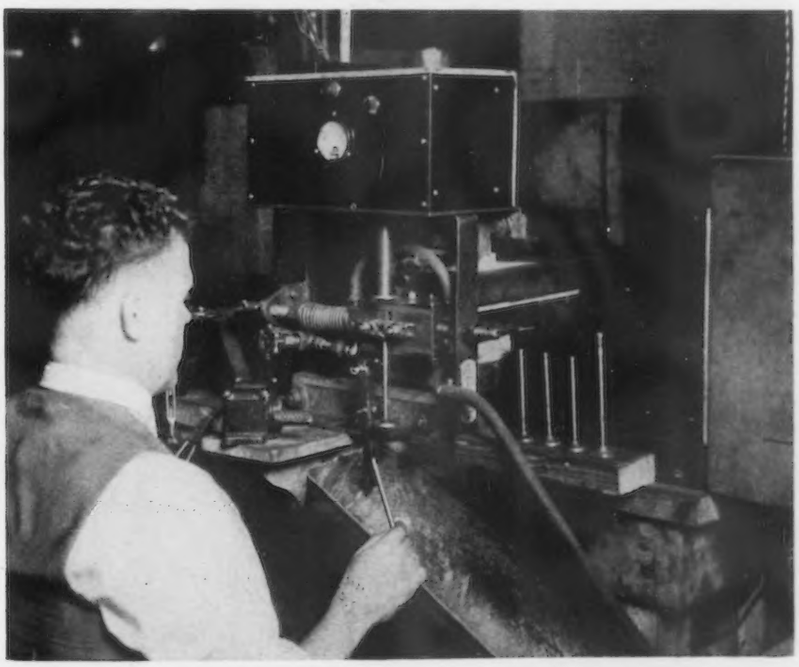


and then gathered into a ball, the first forging operation in making trolling operations is not applied to the battery of machines illustrated.

Pieces pass from the gathering machine (on the floor above) through the pipes to a conveyor, which delivers them through a chute from which they are fed into a heading machine. This performs the second and final valve head forging operation.

(Below) The electric eye automatically controls the operation of a machine for hardening electrically the tips of automobile valves. This control assures a proper and uniform hardness by shutting off the current and releasing the piece when it has reached the proper temperature, as shown by the color, and discharging it into a quenching tank.

The valves are headed without being reheated, this being made possible by the arrangement of the forging equipment for the rapid flow of work from the gathering to the heading operation. The gathering machines are located on a mezzanine floor and beneath each battery of these machines on the ground floor is a special-type Manville valve-heading machine. On taking a valve from the gathering machine, the operator drops it into a steel pipe, through which it falls on to an endless chain conveyor located above the heading machines. This conveyor discharges it into a chute, which delivers it into a screw-feeding mechanism. From this it passes into a slot, down which it slides in a perpendicular position. At the bottom of this slot it is grabbed by the fingers of the heading machine.



One blow of the header flattens out the ball end to the proper thickness for the valve head. From the heading machine the pieces go on to a short conveyor, which discharges them into shop boxes for removal to the machine shop. The work moves so rapidly from the gathering machine to the heading machine that the heat of the piece has been reduced to only about 1800 deg. when it reaches the header. The heading equipment consists of two 150-ton and three 250-ton headers.

A new method has been adopted for making keyways in the stems of valves used in a popular make of automobiles, and has resulted in marked saving in labor in performing the operation. Formerly this work was done in the machine shop by drilling three holes and broaching out the keyway. This operation has been transferred to the forge shop, where the keyway is made while the metal is hot. The stem of the valve is inserted in the flame of a special

oil-fired furnace with automatic temperature control. Across the front of the furnace is a series of round holes, each of which is just large enough to stick the stem through. When the stem is heated to 1800 deg., the furnace tender passes the valve to the operator of a punch press at the side of the furnace and he cuts out the keyway with a broach. With this method, two men make keyways at the rate of 400 to 500 an hour.

The valves, after being headed, are annealed in a gas-fired furnace. Then they go to the machine shop where the various machine shop operations are performed, the work moving progressively from machine to machine for successive operations.

Hardening the Tips of Valve Stems

Hardening of the tip of the stem to resist wear follows. This is done electrically in a special machine, the base and coil of which is a standard electric rivet heater. This machine is provided with photo-electric control. The valve is placed by hand in the jaws of a holder and the tip is heated to the required temperature by electric current. When the tip is at the proper heat, as is shown by the color, the electric eye shuts off the current, causing the jaws to open and release the piece. By the use of the photo-electric tube, very close as well as automatic temperature control is provided.

The valve drops from the jaws of the hardening machine into an oil quenching tank. After quenching, the head is stenciled to show the kind of steel and the type of valve. Following this operation, the stem is given an intermediate grinding, the seat is finish-ground and the end is ground square with the stem and finally the stem is finish-ground on a centerless grinder.

Inspection, which follows, starts with a visual inspection and the gaging of each valve for length. Then the valve is placed in a Comparator having an amplification of 90 to 1, in which the concentricity of the stem is tested. A similar instrument is used for testing the diameter of the stem, which is held within $\pm$ 0.0005 in.

The valves are weighed and counted after inspection, and then slushed in hot oil to dry out the water left on the surface after the grinding operation and to give the pieces a protective coating. They are carried through the slushing machine in pans on wheel-mounted racks. Surplus oil passes through perforations in the bottom of the pan to a drip tank beneath. Then the valves are wrapped in paper and placed in cartons for shipment.

THOROUGH PLAN QUICK MOVING

IN less than 30 days—from Oct. 18 to Nov 16, 1931—the machine shops and offices of the Keller Mechanical Engineering Corpn. were moved from Brooklyn, N. Y., to the works of Pratt & Whitney Co., Hartford, Conn., which recently absorbed the Keller company, as announced in THE IRON AGE of Oct. 15. Within almost the same period, buildings were rearranged, and in one case remodeled, to house properly the production departments of the new division.

The project involved the handling at each end of some 55 freight car loads and 10 automobile truck loads of machine tools, small tools, gages, jigs and fixtures, patterns, rough and finished stock and shop and office furniture and records. It was put through not only with gratifying dispatch, but without damage or loss in shipment and without a single accident.

As the results may be taken to indicate, careful planning lay back of this moving of the Keller shop to its new home, some 120 miles distant. The problem was to move an operating plant, and to execute the moving with the least possible delay to existing Keller production schedules and with the least interference with operations and personnel at the Hartford works. Then, considerations of minimum labor and other expense, a chronic habit of the modern manufacturing executive, were not to be overlooked. Both these objectives exerted strong pressure to provide in advance against interfering contin-

Limited yard clearance complicated the handling of long columns and girders; gasoline tractor cranes were used to get them into the driveway and to swing them into position for pulling into the erection floors. ▲ ▲ ▲

NING RESULTS IN OF KELLER PLANT

By R. E. MILLER

Automatic duplicating and milling machines with electrical control are among the tool room and die shop machines built by the Keller division.

gencies, such as double handling, improper identification, incomplete lot shipment and the many others that could occur in a move of this kind.

Brooklyn Shop in Production on Die Sinkers

Die-sinking and toolroom machinery were the main products of the Keller shops, which, when operating at peak, employed 300 men. These machines, widely known in tool and die shops, reproduce dies, punches, molds, patterns, etc., automatically from a master form or template, a cutter or milling tool working in unison with a tracer or guide. Electrical control of all motions of the cutting tool is a basic feature of the more recent designs. The line comprises several sizes of an automatic duplicating die sinker; two types of reducing die sinker, rotary and straight line; an electrically-controlled duplicating machine with capacity up to 60 x 108 in.; and automatic duplicating and contouring milling machines with electrical or hand control. In addition, the company manufactured a variety of flexible-shaft equipment for the sinking, grinding, polishing, etc., and also small tools for use on all of its machines.

At Hartford, the Keller division will operate as a self-contained unit; although, like other P. & W. divisions, it will use certain general departments of the plant, such as the foundry, toolroom, plant maintenance, etc. It is housed in two buildings, one of which contains both light and heavy manufacturing departments, while the other houses the erecting and heavy machining and the electrical parts manufacturing and assembly departments. Production and shop offices are on the floor above the erecting department.

One end of the erecting floor with the steel work in place and the second floor of the old three-story mill-type structure half ripped out. The foundation for the concrete floor is being laid and tamped down.

Moving the Brooklyn shop involved, of course, many steps—to be executed for the most part simultaneously. First of all, quick selection and assignment had to be made of a part of the space made vacant by the transfer of the Pratt & Whitney Aircraft Co. to its new plant at East Hartford. In allocating the various departments, certain changes in the buildings selected, including the remodeling of one building to provide a suitable heavy machining and erecting floor, were seen to be desirable, and these were initiated immediately. Floor layouts of the production equipment were made by means of templates, and stock racks, benches, tool cribs and other shop furniture were ordered.

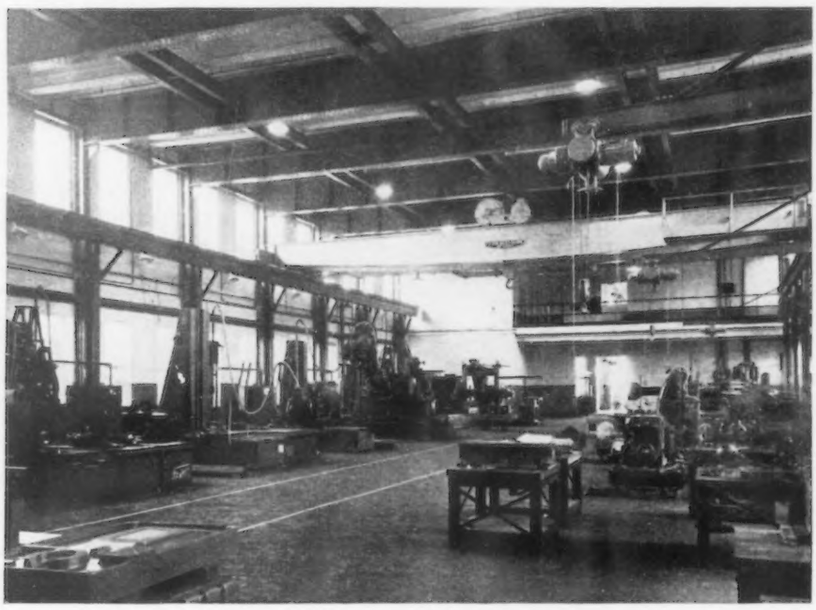
Quick Handling and Erection at Receiving End

While deciding on the order of dismantling and shipping the various Brooklyn departments, arrangements were made for crating and packing, making of platforms and skids and the hauling and shipping. A system of identification markings, including accounting department symbols for raw and finished stock, was quickly worked out; and due consideration was given to procedure to be employed at the receiving end, such as the marking at the freight depot of department and floor locations, and the quick handling and erection of each shipment as received.

So well was this planning done that machine tool equipment was belted to previously erected lineshafting, ready for operation, soon after ar-

rival in Hartford. Storeroom material, marked to correspond with markings on the shelves at the Brooklyn shop, was quickly put in the same places formerly occupied; and in less than a week orders were being filled from these shelves.

Before dismantling and shipping any of the Brooklyn production equipment, however, two or three partly finished large BG die sinkers were transported to Hartford to be finished by P. & W. and Keller men, to meet promised delivery dates.



View of completed erecting floor, with work going forward on regular production. The mezzanine floor at the far end is all that remains of the old second floor.

Next in order was the shipment of spare machines, rough castings, bar stock and other raw material on hand. Shipping of machine tool equipment began with one entire manufacturing group, and was completed with the large planers and radial drills to be located at one end of the erecting floor for the machining of bases and other heavy parts of the larger Keller machines.

The building selected to house the erecting shop and the electrical parts assembly department was a three-story mill-type structure with brick walls, timber columns, girders and heavy plank floors. In the floor space, 60 x 157 ft., there were 60 wooden columns. In addition, the 14-ft. ceiling of the first floor was inadequate, because the larger Keller machines are 13 ft. or more in height; furthermore, sufficient headroom for a 15-ton 57½-ft. span bridge crane was necessary.

Accordingly, it was decided to take out the second floor, and replace the wood construction by steel columns and girders that would adequately carry the load of the third floor and roof and at the same time provide the needed unobstructed space and headroom.

Plans were prepared and the steel fabricating and erecting contract let. Excavation for the concrete floor, the column footings, piping tunnel, etc., under the floor was begun Oct. 12. The first steel work was received Oct. 23, and by Nov. 11 the entire steel work—110 tons—was in place. Meanwhile an 8-in. reinforced concrete floor covered by 3-in. creosoted wood block, giving an 11-in. depth of floor, was laid on a 4-ft. deep trap rock fill.

The steel work consists of 18 main columns and as many crane columns, nine on each side, spaced along the wall on 15-ft. 4-in. centers. The main columns are 12 x 10-in., 53-lb. H-sections and the crane columns, riveted to the main columns, are 10 x 10-in. 49-lb. H-sections. The cross girders, one for each pair of columns, or nine in all, measure 3 ft. 9 in. in depth and 59 ft. 6 in. in length and weigh 8 tons each. The crane girders extending the length of the building carry 60-lb. rails on which the 15-ton Niles floor controlled overhead traveling crane runs.

The entire steel work was put in place before the old wooden construction was demolished. The limited yard clearance complicated somewhat the handling of the long steel columns and girders. With the footings in place, each column (the main column with its crane column) was hoisted through the first-story window by means of gasoline tractor cranes and placed in position through holes provided in the second-story flooring. Then the main or cross girders were put through the second-story windows, jacked up to the under part of the third-story flooring and bolted to their respective pairs of columns. In the same manner the crane girders were put in place and the crane assembled. All this was done rapidly, and when completed, the former posts and all other wood construction, from the girders supporting the third floor down, were removed, leaving the unobstructed, well-lighted erecting floor shown in the accompanying illustration.

Although the original two stories of windows provide for daylight illumination, remodeling the interior of this building necessitated changes in the artificial lighting system. Twelve Benjamin projector-type reflectors have been installed in two rows in the ceiling, each reflector being fitted with a 1000-watt lamp. Ten angle-type reflectors, each with a 300-watt lamp, have been placed along the side walls just below the crane rail, or about 18 ft. above the floor. This lighting is controlled through four inclosed panels, one in each quarter of the room.

Heating System, as Well as Lighting, Rearranged

Rearrangement of the heating system was also necessary. The seven Sturtevant unit heaters, size No. 2, design 3, formerly used were reinstalled, four on one side wall and three on the other. They are now fitted with cold air intake boxes, having cold air intake openings at the floor, the warm air being blown out at a height of 10 ft. The same system circulates cool air in the summer.

Advantage was taken of the remodeling of this building to collect and place within an accessible concrete tunnel all of the steam and water pipes that previously were below the first floor of the remodeled building. This tunnel, 6 ft. 6 in. high by 5 ft. wide, inside, extends under one side of the ground floor of the building. It is equipped throughout its length with structural steel pipe rack, 2 ft. wide, arranged so that all pipe lines carried by it are accessible for inspection and repair. Ample accommodations for future piping installations have been provided.

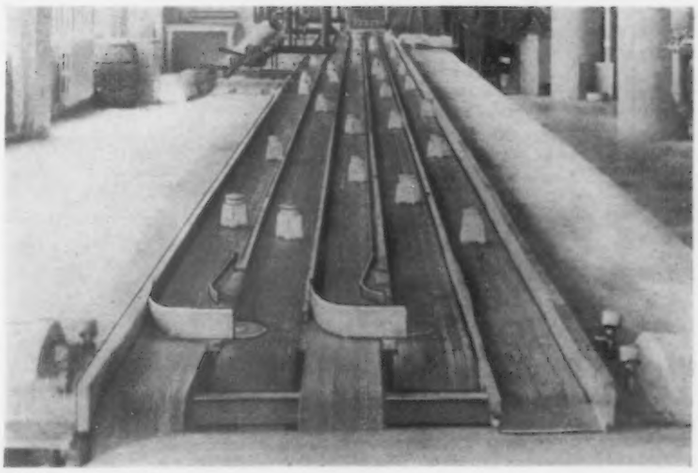
The above details will serve to indicate something of the extent of the work involved in moving the Keller plant to its new home at Hartford; obviously, success was due to thorough planning and clean-cut execution.

Switching Conveyor Loads

By Manual or Automatic Control

IN systems of conveyors, switches can be controlled manually, with cables or levers, and they can also be controlled electrically. With electricity the operation can be made fully or semi-automatic. The switch shown is full automatic. Note the motor underneath equipped with solenoid brake so as to quickly stop the travel in either direction. (Logan Co.)

IN handling systems using conveyors, the method of transferring from one conveyor to another is often very important. The individual belts shown travel in alternate opposite directions, the transfer from one to the other being effected by means of revolving disks which automatically pick up and deliver to the next belt the smallest jars and vials. This same method could be used for larger objects and packages. (Standard Conveyor Co.)



THIS illustrates the alligator switch. Note the special section of gravity to the left. This construction gives a flexible curve to the switch section. The use of this type of curve permits the switch to swing in a wide arc with a minimum horizontal length. In this installation each switch is serving five storage lines of gravity conveyor. (Logan Co.)

THE electric pit-type furnace, with the cover and insulating plug removed. Samples of the preceding charge are shown around the base of the furnace. On the insulated plug are shown bars of super-high-speed steel, and several lumps of coke of the size used in the crucible. ▲ ▲ ▲

ELECTRIC ANNEALING OF HIGH-SPEED STEELS

By WIRT S. SCOTT
Westinghouse Electric & Mfg. Co.,
Mansfield, Ohio

HIGH-SPEED and super-high-speed steels, after forging, are full of terrific strains and stresses. If these are not thoroughly removed before the hardening and tempering operation, additional stresses will be set up in the steel which may cause the tool to break at any time. In fact, sufficient stresses may be set up to cause the tool literally to explode. The annealing operation is by far the most important heat-treating operation in the perfection of these steels.

Where the forged stock is in relatively short lengths, it is the practice to accomplish the annealing in a muffle, packing mica dust around the steel so as to exclude all air and thereby prevent oxidation. The mica dust is also supposed to give a uniformly slow cooling for the proper anneal.

In a manufacturing plant where a considerable quantity of such steels was worked up into tools to be used in the production equipment, an investigation was made to locate the cause of trouble being experienced in the breakage of such tools. The investigation showed that it was probably due to the annealing. Temperature exploration tests of the charge of steel under heating and cooling confirmed this.

The stock, before being annealed, was forged either into bar stock or directly into tools, which consequently left some scale on the surface. The bar stock or tools were anywhere from 12 in. to 24 in. long.

Pit-Type Electric Furnace for Annealing

In designing a crucible-type electric furnace for this application, no thought was given at the time to abandoning the use of the mica dust, as that was considered by the heat treaters as an essential part of the process.

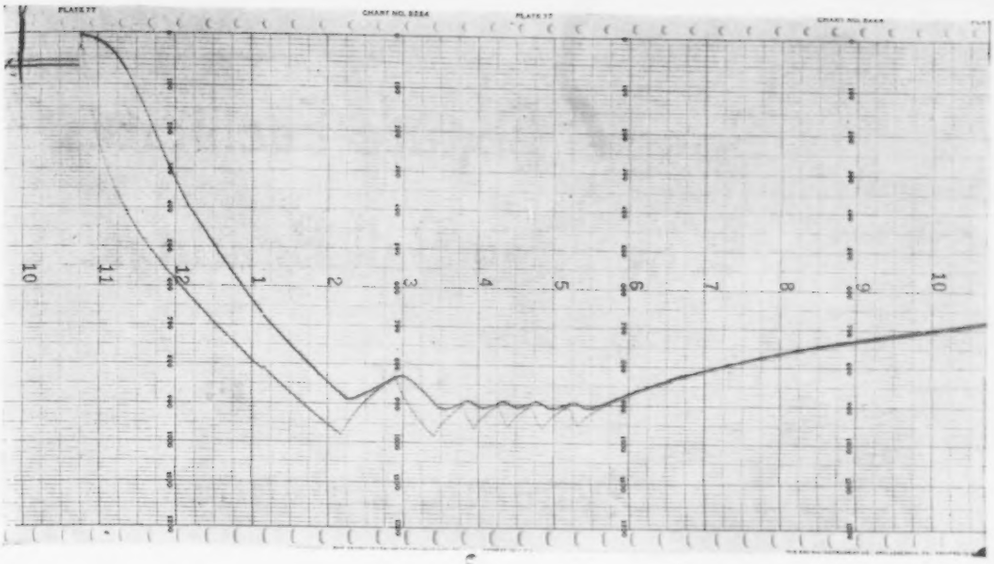
With the pit-type electric furnace as supplied, having a vertical crucible made of cast nickel-chromium alloy 17¼ in. in diameter by 35½ in. deep and a sand sealed door, the opportunity was presented for experimenting with gas as a non-oxidizing agent rather than using the mica dust. Charcoal was first used, but it was found to burn up too rapidly. Coke, free of sulphur, was then tried, and found to be 100 per cent successful. One-quarter of a peck, placed in the furnace, would last about a week.

A remarkable thing brought out is that there appears to be even less scale on the work after it comes out than when it goes into the furnace. Whatever scale is on the steel is very flaky and can be brushed off with the hand. With a gas furnace, 60 hr. was required to get out a heat—12 hr. for heating and 48 hr. for cooling. With the electric furnace a heat is being obtained in exactly 24 hr.—7 hr. heating and 17 hr. cooling.

Four test samples were taken out of the charge, selected at random, and given a Brinell test. These tests were:

No. 1.....	228	No. 3.....	256
No. 2.....	241	No. 4.....	256

From these tests, it is evident that the high-speed steel was dead soft and thoroughly annealed.



TWO-POINT temperature control recording chart. Heavy line indicates temperature of the charge. Light line indicates the temperature of the heating element. Degrees are in centigrade. The current was cut off the furnace only once by the temperature of the heating element. After that, the cutting on and off was due entirely to the temperature of the charge.

While the furnace has not been in use long enough to obtain accurate data as to its effect on the life of the tools, which it undoubtedly will show in time, there are positive indications that the steel is in a better condition for hardening. A considerable amount of the super-high-speed steel is cut up into tips of various sizes for forming the tips of cutting tools. This steel must be cut up into the required sizes in a hack saw cutting machine. Since using the electric furnace, the hack saw blades withstand three times as much cutting as they would formerly stand before having to be resharpened. In addition, the steel is much more easily and quickly cut.

The electric furnace supplied for this application is equipped with two thermocouples and a two-point recording and controlling pyrometer. One thermocouple, of the protected tube type, extends through the top of the furnace, and is of sufficient length to reach down into the center of the charge. The other thermocouple extends through the side of the furnace, where it is influenced directly by the temperature of the heating elements.

The temperature control chart clearly indicates the functioning of these couples and the pyrometer. The charge is heat treated at 900 deg. C. (1652 deg. F.). Hence, the instrument is set to control the charge at that temperature. The limiting temperature on the heating element is fixed by the pyrometer setting at 980 deg. C. (1796 deg. F.). On heating up, the temperature of the heating element reaches 980 deg. before the work reaches 900 deg.; hence, the pyrometer causes the control to cut off the current. The charge continues

ELECTRICALLY heated pit-type furnace for annealing high-speed and super-high-speed steel. Approximately one-third of the furnace is below the level of the floor. The white rim of the furnace is the sand seal trough, leveled off, and the cover is being lowered into position. The insulated plug-type inner covering for the crucible is shown in position. The protected-type thermocouple is centered for lowering with the cover, directly into the heart of the charge.

to heat up for a short period of time after the current is off, and when the current comes on again there is only a small temperature differential between the charge and the heating element.

After one more cutting off by the temperature of the heating element, the temperature of the charge has reached 900 deg. C., and from that time on the temperature of the charge controls the cutting on and off of the current, the charge being held within 7 deg. C., while the maximum temperature of the heating element becomes 960 deg. C. In other words, at operating temperature, the temperature of the heating element is only 60 deg. C. above the temperature of the work.

After the charge reaches 900 deg. C., it is held at that temperature for two hours and the current cut off. When the charge has cooled to 400 deg. C. (752 deg. F.) it may be removed from the furnace. Three hundred and fifty pounds of high-speed and super-high-speed steel is heat treated at a time. This steel costs anywhere from $1.50 to $2.50 a lb.

The furnace, being of a vertical type, lends itself in the best possible manner to loading and unloading. There is no guess work about where the thermocouple is placed. It may most conveniently be placed in the center of the charge, and one can tell from its position whether or not it is in the correct place. In other words, it is easier to place the couple in the proper position than only partly in the charge.

There is no guess work as to when the charge is thoroughly heated. The couple being in the center of the charge, it is the last part of the charge to reach the final temperature. Soaking at the annealing temperature for 2 hr. after the couple reaches the correct temperature is guarantee of thorough saturation at heat throughout the entire charge.

The elimination of the mica dust removes a messy handling proposition and also permits the charge to heat up more quickly and to cool down faster. Perfect anneals are being obtained in one-half the time.

Repeated tests on the electric furnace showed maximum differences in temperatures of only 20 to 36 deg. F. At the time the temperature graphic chart shown was produced, there was annealed 400 lb. of steel, with a power consumption of 135 kwhr. This gave a production of 3 lb. of steel per kilowatt-hour consumed, a negligible cost in comparison with the value of the steel and the results being obtained.

Special Fixture Facilitates Checking Ball Bearings for Dynamic Balancer

BALL bearings used in the rollers and headstocks of the precision balancing machines built by the Gisholt Machine Co., Madison, Wis., must meet very exacting requirements. The bore of the largest bearing used, for instance, has a tolerance of 0.0003 in., and the radial runout in any bearing must not exceed 0.0002 in.

The necessity for such extreme accuracy lies in the fact that the machines in which the bearings are used are designed to measure very accurately the unbalance in a rotating body; in a 100-lb. crankshaft, for example, a tolerance of no more than 0.3 oz.-in. is allowed. An ounce-inch, the unit of unbalance, is equal to the unbalance caused by a 1 oz. weight at 1-in. radius, or a 2 oz. weight at a ½-in. radius, etc. Any radial runout in the bearing will cause the part being balanced to rotate eccentrically and thus create a false reading of unbalance. A runout of 0.001 in. in a bearing may cause the part being balanced to run eccentric by the same amount and create an error of 1.6 oz.-in., or over five times the permissible error, in the test of the 100-lb. crankshaft.

To avoid any possible inaccuracy from this source, all ball bearings for use in the balancers are carefully inspected, and to place this inspection on a definite mechanical basis the company has devised the fixture shown in the accompanying illustrations.

This fixture consists of a spindle driven by fractional horsepower motors through worm gearing and mounted in a journal on the outside of which are suitable attachments to locate and support a dial indicator in the necessary positions. The ends of the spindle projecting from the jour-

Previous to checking for eccentricity and other inaccuracies, the bearings are inspected for outside diameter and width. Extreme care is taken to prevent exposure of bearings to dirt and dust.

nal constitute very slightly tapered gages for the bores of the various bearings inspected.

Outside Diameter and Width Checked First

After checking the outside diameter by a comparator arranged to read to 0.0001 in. and checking the width by means of a micrometer caliper, the bearing is slipped up on the tapered portion of the spindle where two lines indicate the permissible smaller and larger limits of the bore. A bearing which will not pass over the first line or which passes beyond the second line is rejected as having a small or large bore respectively.

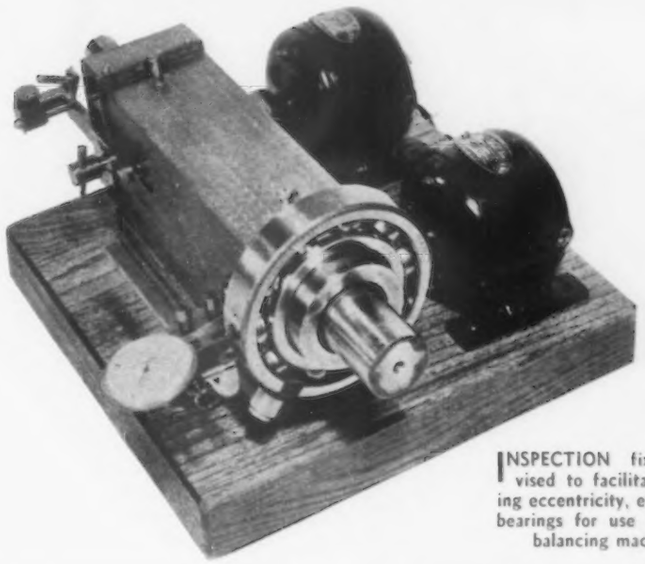
With the bearing firmly seated on the spindle the radial runout or eccentricity is observed by means of the dial indicator placed against the outside diameter while the inner race is rotated at 58 r.p.m. and the outer race held stationary. The slow speed of rotation and the use of an indicator reading to 0.0001 in. permit very accurate inspection. Longitudinal runout is observed in the same manner with the dial indicator reading from the face of the outer race.

Inspecting the ball bearing for friction and the presence of foreign matter is of too great importance to be left to the sense of feel of the inspector's hands or to his individual judgment. For each different size of bearing certain maximum and minimum weights are specified for this phase of the inspection. With the bearing mounted upon the spindle, the smaller weight is attached to the outer race by a spring clip and the spindle is then slowly rotated by the motor. To pass inspection the outer race must rotate with the inner race, carrying the weight around with it; this shows that the bearing is closely fitted and has no radial play.

Inspected for Presence of Foreign Matter

Passing this requirement, the larger weight is substituted for the smaller and the spindle is again rotated slowly. To indicate that the friction is not excessive, this weight must prevent the outer race from rotating with the inner. This test is continued for about 2 min., during which the presence of foreign matter will be detected by sporadic rotation of the outer race with the inner race in spite of the restraining influence of the weight.

This inspection is made immediately after receipt of a shipment of bearings. Extreme care is used to prevent exposure of the bearings to dust and dirt, and a room temperature of close to 70 deg. is required. Bearings passing this inspection are dipped in a clean mixture of Nys delicate machine oil and rose oil in proportions of one to two. They are then wrapped in clean waxed paper and sent to the storeroom in the original paper boxes, on the seal of which is indicated their acceptance.



INSPECTION fixture devised to facilitate checking eccentricity, etc., of ball bearings for use in Gisholt balancing machines.

How Casting Temperature and Additions of Iron Affect Bearing Bronze

THE effect of casting temperatures and of additions of iron on the properties of bearing bronze material consisting of 80 per cent copper, 10 per cent tin and 10 per cent lead, has been investigated by the Bureau of Standards, Washington. In addition to determinations of hardness and microstructure of this leaded bronze, several methods of tests were employed which simulated certain phases of actual service conditions. These tests included deformation under pounding, resistance to impact or notch toughness, and resistance to wear both dry and in the presence of a coolant. As bearings are usually above room temperature while in operation, a considerable number of the above tests were conducted at elevated temperatures.

In the founding of bronzes it is seldom possible to pour all castings at the same temperature because the m tal is drawn from the furnace at various temperatures and cools in the ladle during pouring operations. The study of the effect of different casting temperatures thus aids the manufacturer in producing better castings and at the same time helps the consumer by predicting what variations in properties may be expected of bronzes cast at various temperatures. In the study of 80-10-10 bronze cast at temperatures varying from 1850 to 2120 deg. F., it was found that, as the casting temperature, the grain size, and the resistance to wear were increased, the hardness decreased slightly, and a slight tendency was noted for more even lead distribution. Casting the bronze at about 2000 deg. F. caused a decrease in the resistance to impact or lowered the toughness as shown by the notch test. The deformation under pounding was a minimum in specimens cast between 1900 and 2000 deg. F.

Although iron is not usually added intentionally to leaded bronzes, small amounts often accumulate during the process of manufacture through the use of scrapped bearings, iron stirring rods, etc. While the iron content is quite small in most cases, the effect of this element is generally considered harmful, and in the reported investigation the iron content which varied from 0 to 1.0 per cent was studied to determine its effect upon bearing bronzes. In general, it was found that iron additions over 0.3 per cent were detrimental to the bronze investigated. Small addition of iron (up to 0.5 per cent) decreased the resistance to wear and increased the hardness. When the iron content exceeded 0.3 per cent, segregation of the lead particles occurred, the grain size was reduced, and a decrease was noted in the notch toughness. Additions of iron up to 1.0 per cent increased the resistance to pounding.

MODERN PAINTING FOR MODERN

By HERBERT CHASE
Consulting Engineer, New York

THE well-painted plant is usually a cheerful place in which to work and congenial surroundings are conducive to good work. Labor turnover is reduced. Cleanliness is encouraged and the psychological as well as the physiological benefits to workers are not to be overlooked. Even more important in some respects is the effect upon vision. Properly painted ceilings in particular have a marked effect upon visibility, especially when natural light is depended upon in areas somewhat removed from windows or skylights. The quantity of artificial light required can also be reduced with properly-painted interiors. There is, therefore, ample reason for the contention that money intelligently spent on interior painting pays good dividends, and for inquiring what constitutes good painting.

A most important factor in proper interior painting is the selection of the colors employed. For upper walls and ceilings a color with high light-reflection value is most important, for no light except that which is reflected can reach that side of work away from the light source except by reflection from some surface, and the largest surfaces available for such reflection is that of the ceiling and walls, including the vertical surfaces of beams and columns. Much of the light that enters through windows and skylights is lost unless it is reflected from such a surface. Although all modern artificial lights are fitted with their own reflectors, some light always reaches walls and ceilings and unless efficiently reflected by them just that much light is subtracted from the illumination of the work itself and from other objects which the worker needs to see clearly if he is to work efficiently.

INTERIOR of the Ford steel mill, an example of a well-painted and well-kept plant. Walls, ceiling and steel work are painted a cream color, approximating white. The dado is gray and the machines black.

Photographs, courtesy the New Jersey Zinc Co.

Colors Vary in Reflecting Ability

Colors vary greatly in their light reflection ability, as the figures given in Table I indicate. These figures, resulting from tests made by the Munsell Color Company for the New Jersey Zinc Company, show the percentage of light by what is termed diffused reflection, as distinguished from the direct reflection from a polished surface. It is measured at an angle of 45 deg. to the surface with the light striking the surface normally; that is, at right angles,

PLANTS

PROPER selection of colors affects lighting, seeing ability, cleanliness, appearance and working conditions. The psychological effects are also important.

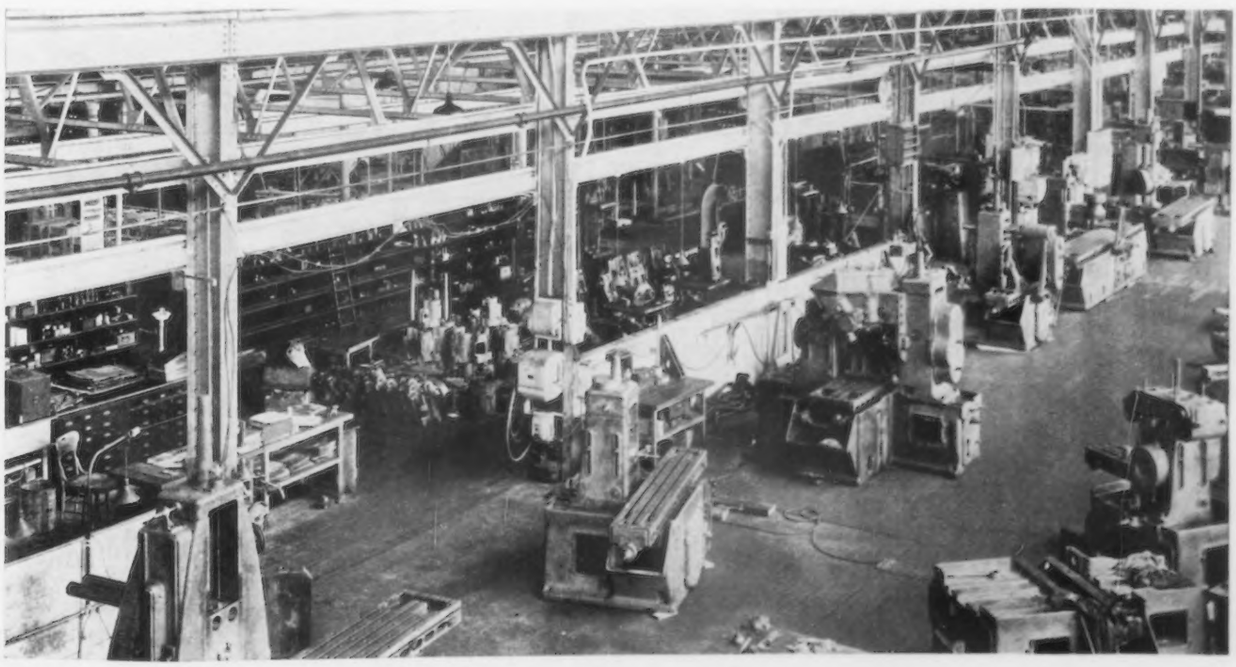
Well managed plants are nearly always well painted. One might say that there is a close relation between paint and profit.

Mr. Chase brings the plant manager some sound ideas and suggestions on this important phase of maintenance.

and is the type of reflection which is depended upon to bring to the eye all light which does not come direct from the source or by direct reflection from a polished surface.

As will be seen, white, which is without color, is much the most efficient, or gives the highest light reflection value. It is, therefore, the best "color" to use on upper walls and ceilings for nearly all factory conditions in which good lighting is an important consideration. In rare cases, where there is an excess of light at some times of the day, a pure white on some surfaces may result in glare which is trying to vision. A very light tint of a light color then is desirable for upper walls and a still lighter near-white for the ceiling. Even a light tint, however, reduces the light reflection value from 10 to 30 per cent or more, hence the least departure from white that will meet other requirements is desirable for the surfaces mentioned. For the same reason, a white which is allowed to become dirty or which, because of inferior materials in the paint, discolors quickly, is likely to have a marked effect upon illumination. Not infrequently such a deficiency is made up or there is an attempt to compensate for it by increasing the wattage of electric illumination. The increased consumption of current may then easily cost more than would a new coat of paint or washing of surfaces that do not need repainting.

Mills in which excessive smoke and other factors tend to dirty a white surface quickly, present another problem, the best solution of which is to get rid of the smoke or fumes through modernized equipment or adequate means of ventilation. Where this is not feasible, some color may be substituted for white, but of course with considerable loss in light reflection value. It is often argued that a color which does not show soil quickly or readily is advantageous and this undoubtedly is true in some instances. But it should not be forgotten that a surface which does not show soil may be no less dirty than a light colored one and to that extent encourages the accumulation of dirt. A light green is sometimes recommended for exposed trusses and other overhead steel work, "to give a feeling of support" and if there are many of these surfaces aluminum paint may



WHITE paint on the walls and structural members in this Kearney & Trecker plant, Milwaukee, not only adds to the fine appearance, but its high light-reflecting value aids both natural and artificial illumination.

be satisfactory. Contrary to general belief, however, the light reflecting value of aluminum paint is not high, less than half that of white and lower even than light gray.

Best Colors for Lower Walk

There is much diversity of opinion concerning the best color for dados or lower wall areas and the corresponding portions of columns. A great deal depends upon the general effect desired, the exposure and amount of light available, probable frequency of cleaning and other factors. Different colors produce decidedly different psychological effects. Thus, red is a "hot" exciting color and is seldom recommended for large areas. It is properly associated with danger, fire and fire-fighting equipment. Orange and yellow are "warm" colors as are also the buffs and browns that contain them. They help to make a cheerful interior but are apt to make a room feel warm or even hot and so are not recommended for rooms that are normally warm or sunny. Conversely they are excellent for rooms that are normally cool or cold. By contrast green is cool and restful and blues are cold and dainty. Light tints of blue help to make a room that is normally hot feel cooler, just as the shades of red, orange and yellow help to make it feel warmer. A cream or buff color is much "warmer" than white, green or blue, and is often employed for this reason, even on upper walls when a warm effect is desired. Rooms tinted blue have often brought complaints of feeling cold, though the thermometer showed otherwise. When recolored in tints of yellow or buff, but with no actual change in temperature, all complaints of being cold ceased.

Facts such as these properly have a bearing especially upon the color

Table II—Standard Values* Applied to Painting Jobs

	Painting Operation	WOOD				BRICK				CEMENT & PLASTER				METAL			
		Smooth Never Painted Before	Rough Never Painted Before	Smooth Painted Before	Rough Painted Before	Smooth Never Painted Before	Rough Never Painted Before	Smooth Painted Before	Rough Painted Before	Smooth Never Painted Before	Rough Never Painted Before	Smooth Painted Before	Rough Painted Before	Smooth Never Painted Before	Rusty Never Painted Before	Smooth Painted Before	Rusty Painted Before
VALUES PER SQ. FT.—3 IN. BRUSH—WHITE PAINT																	
Wall	Prime	.039	.046	.037	.044	.057	.067	.055	.066	.053	.062	.050	.059	.037	.044	.035	.042
"	Gloss	.037	.044	.035	.042	.056	.064	.054	.064	.052	.061	.049	.057	.036	.042	.034	.040
"	Gloss/coat	.....	.....	.039	.054	.....	.....	.058	.082	.....	.....	.053	.072	.....	.....	.037	.051
Ceiling	Prime	.041	.050	.040	.048	.063	.073	.059	.072	.056	.067	.054	.063	.040	.048	.038	.046
"	Gloss	.039	.048	.038	.045	.062	.069	.057	.069	.055	.066	.053	.061	.039	.046	.037	.043
"	Gloss/coat	.....	.....	.042	.058	.....	.....	.062	.090	.....	.....	.057	.077	.....	.....	.040	.055
Floor	Prime	.038	.047	.039	.046	.060	.070	.057	.069	.054	.065	.052	.061	.039	.046	.037	.044
"	Gloss	.037	.046	.037	.044	.058	.067	.056	.067	.053	.064	.053	.058	.038	.044	.036	.042
"	Gloss/coat	.....	.....	.040	.056	.....	.....	.060	.085	.....	.....	.055	.076	.....	.....	.039	.053
VALUES PER SQ. FT.—3 IN. BRUSH—COLORED PAINT																	
Wall	Prime	.034	.039	.031	.037	.049	.056	.047	.057	.045	.053	.043	.051	.033	.039	.031	.037
"	Gloss	.033	.037	.030	.035	.048	.058	.050	.058	.044	.052	.042	.049	.032	.037	.030	.035
"	Gloss/coat	.....	.....	.033	.045	.....	.....	.053	.061	.....	.....	.045	.063	.....	.....	.033	.044
Ceiling	Prime	.036	.040	.034	.040	.053	.064	.051	.062	.048	.058	.046	.055	.035	.040	.034	.040
"	Gloss	.035	.038	.033	.039	.052	.062	.050	.060	.047	.056	.045	.050	.034	.038	.033	.042
"	Gloss/coat	.....	.....	.035	.047	.....	.....	.054	.075	.....	.....	.049	.068	.....	.....	.035	.047
Floor	Prime	.035	.040	.033	.039	.051	.062	.049	.059	.047	.056	.045	.053	.034	.040	.033	.039
"	Gloss	.034	.038	.031	.037	.049	.060	.048	.057	.046	.054	.044	.051	.033	.038	.032	.037
"	Gloss/coat	.....	.....	.031	.044	.....	.....	.052	.069	.....	.....	.047	.066	.....	.....	.034	.045

*Values are in terms of time-units of work, and are expressed in *tenths* of hours. To convert to regular decimal values in hours, the decimal points should be moved one place to the left.

THIS all white interior of the Hamilton Watch plant is a great aid to good seeing, especially at the center rows of benches where operators work with their backs to the windows.

selected for both upper and lower wall areas. A good general rule is to paint the ceiling white, the upper walls either white or a very light tint of either the warm or the cool color desired, and the dado a darker shade of the same color, but as light as the degree of cleanliness that it is feasible to maintain will permit. Grays are seldom recommended as they are inclined to be depressing. About their only advantage is that they do not show soil so readily as some colors. Dr. Luckeish, the General Electric authority on light and color, associates gray with the penitentiary and, as a pleasing contrast, suggests the following as a representative "cool" color scheme for the factory: Near-white for ceiling, either a mere suggestion of yellowish green or even a cream; medium tint of pea green for upper walls and other large vertical areas; gray-green for dado and lower portion of columns and possibly for machinery. Many concerns have experimented with orange, yellow, green and blue on machines and there are indications that these or some other colors may yet take the place of the standard machine tool gray.

In one shop, that of the Armstrong Machine Works at Three Rivers, Mich., where the management takes considerable pride in the appearance of its plant, a flat white paint is used for the ceiling. This paint covers about 500 sq. ft. per gallon, one coat, and is sprayed on at a labor cost of about one cent a square foot. Data on the time required for painting wood, brick, cement, plaster, and metal surfaces with a three-inch brush are given in Table II, taken from Report No. 520 of the Alexander Hamilton Institute prepared recently by Stewart M. Lowry and entitled "Financial Incentives for Factory Workers," which is an outgrowth of Mr. Lowry's long experience in work for the Westinghouse Electric & Mfg. Co. and other industrial organizations.

Wage Incentives Applied to Plant Painting

In this report Mr. Lowry makes it clear that wage incentive plans can be applied successfully to maintenance work, such as painting, as well as to production work. In both instances, however, it is necessary to establish certain standards as a result of careful analytical and complete time studies. Such standards must take account of many factors such as the character and location of the surface to be painted, method of applying the paint, mixing the paint, setting up and moving scaffolding and the like. Table II shows one of many sets of standards established for painting operations. After using the wage incentive plan in painting work for nearly three years the average production rate was found to have increased 36 per cent, the costs to have been reduced 28 per cent and the average wage of the worker to have increased 13.8 per cent. Only 15 per cent of the gross savings was required to operate the incentive plan.

In a paper presented before the National Industrial Congress early this year by T. J. Maloney, of the New Jersey Zinc Co., it was pointed out that the painter never stands to lose by the wage incentive plan unless he is so inefficient that he must be discharged, for he receives his regular hourly rate even though his work falls below the standard set. A part of the increased output is the result of better planning and scheduling of work. In some instances 80 per cent of the premium paid goes to the workmen and the remainder to foremen and supervisors. To get the most out of the plan the foreman must plan ahead and anticipate his labor requirements well in advance.

It is not essential, of course, to use incentive plans to do painting economically, but in plants where the volume of such work is sufficient to warrant the time and other studies that are necessary to establish acceptable standards and operate an incentive system, it appears to merit seri-

(*Concluded on page* 410)

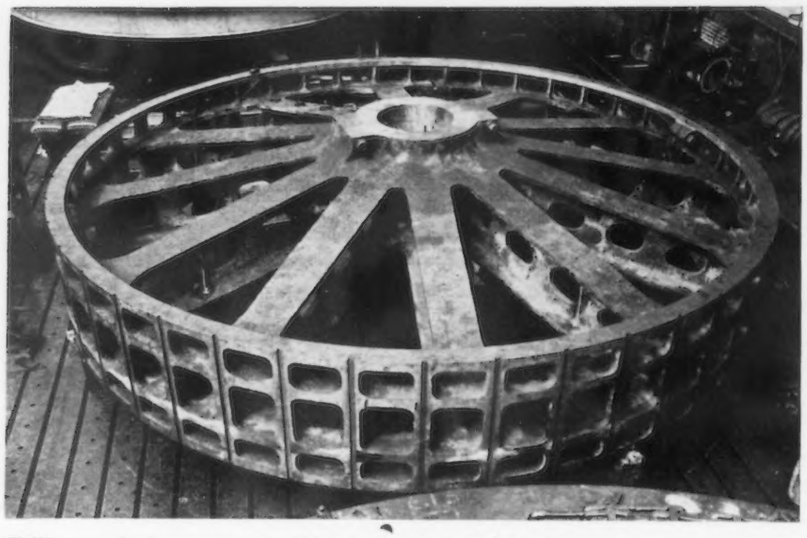
Table I—Light-Reflection Values of Colors

	Per cent
White	84.0
Cream	70.4
Ivory	64.3
Light Yellow	60.5
Light Pink	69.4
Flesh	56.0
Dark Red	14.4
Buff	55.4
Light Brown	23.6
Light Green	54.1
Sage Green	41.0
Dark Green	9.8
Light Gray	53.6
Aluminum Gray	41.9
Light Blue	45.5
Dark Blue	9.3
Dark Gray, approximating machine-tool gray	15.0

Data as determined by the Munsell Color Co. The values depend, of course, upon the particular shade selected. The "light" colors named are mostly very light tints.

THE USE OF STEEL CASTINGS IN WELDED STRUCTURES

By J. G. RITTER,
Welding and Foundry Engineer,
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.



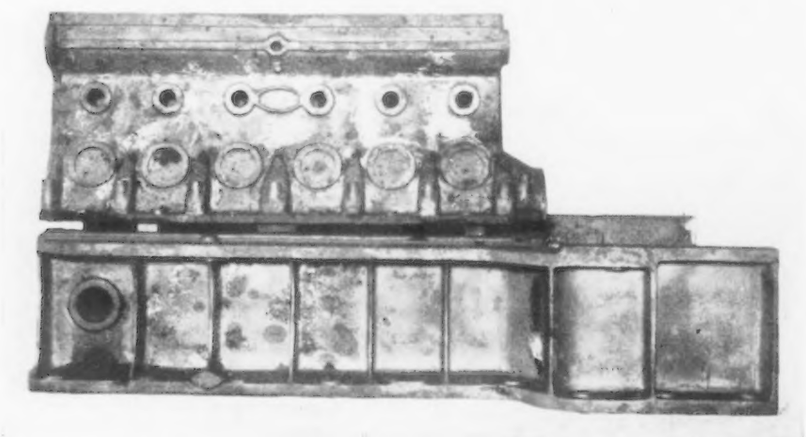
THIS waterwheel generator rotor (25 ft. in diameter) can be made more economically of cast steel even if only one is to be constructed.

THE use of welding in the construction of machinery parts has increased very rapidly in the last few years. Welding can now be considered as fundamental a process as riveting and casting for making products of metal. The Westinghouse company is a large user of welded structures, castings and structures formed by combinations of castings and welded steel. Over 1000 tons of welded structures are manufactured a month in spite of the fact that the company operates five iron foundries and one steel foundry.

Cost Considerations

The experience of the last few years has established quite definitely the economical dividing lines between the different methods of construction. The relative cost of a riveted to a welded structure is quite easy to determine, being largely a comparison of the actual cost of the riveting operation with that of welding. Riveting has been practically eliminated, even in departments which had elaborate riveting equipment. The comparison of the cost of a welded structure with a casting becomes much more complicated, especially when the manufacturer operates a foundry. In general the most important factor involved is the number of pieces which are to be made. If there are only a few pieces the saving of the cost of a pattern usually insures a cheaper construction in welded steel. One of the illustrations shows a bearing pedestal of welded construction which can be more economically made by casting it if more than four of one design are needed.

When the activity is high the pattern does not affect the cost comparison very much. The pattern cost is usually about the same as that of the jigs and special tools required for the high production of welded structures. An illustration shows a synchronous motor which is made in quite large numbers. The frame, rotor and bedplate is of welded construction and the bearing pedestal is made of cast iron. It has been established that bedplates of welded construction are the most economical regardless of the quantity involved. This is due to the fact that this type of structure has a relatively small amount of welding and fitting for the weight involved. They are constructed of standard rolled shapes, cut to length and fitted with very little labor and waste material. This is in contrast with the motor frame which is constructed by burning annular rings from a plate with quite a high labor cost and scrap ratio.



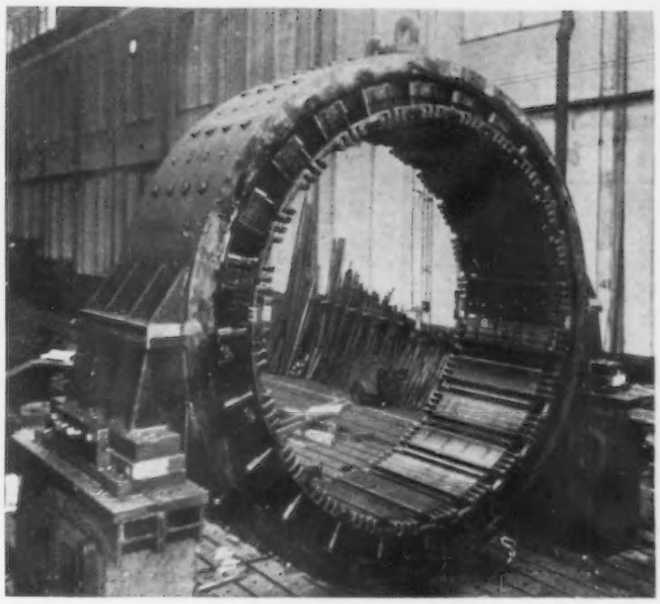
Because the walls of these castings had to be very thin it was found more economical to make the lower piece, a bed plate, of welded construction.

Quick Delivery Is a Factor

There is another factor besides cost which is often involved when deciding on which form of construction is to be used. This factor is the question of quick delivery and the welded construction has the advantage here. The 7000-hp. motor shown in one of the illustrations was completed in a very short time through the use of welding. This motor is used for a steel mill drive. The main frame is composed of bars of 9-in. x 30-in. steel rolled into shape and welded together.

In general, the welded structure

THE choice between welded steel structures and castings requires careful study of each part to be made. A large manufacturer of electrical equipment finds that for many applications steel castings are more economical than weldings. In other cases it has been found advantageous to use steel castings as parts of welded structures. Some of the considerations that determine how parts of electrical equipment are to be made were outlined by the author in a recent address, here abstracted, before the Steel Founders' Society of America.



The main frame of this 7000-hp. motor is made of bars of 9-in. x 30-in. steel rolled into shape and welded together. In the fabrication of this motor the necessity for quick delivery gave welded construction the advantage.

does not have as great an advantage over steel castings as it does over iron castings. This is due to the fact that cast steel is equally as strong as the rolled steel used in welded construction. When replacing an iron casting the welded construction can be made much lighter and the welds do not have to be very large in order to give a structure comparable in strength.

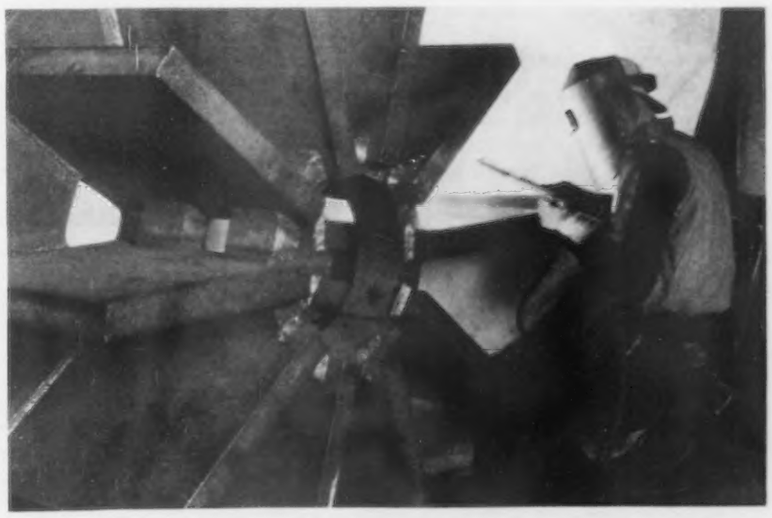
In steel, however, the design has to be followed almost exactly and the welds have to be large enough to develop the full strength of the steel sections. The waterwheel generator rotor shown can be more economically made of cast steel, even if there is only one to be constructed. The rotor is 25 ft. in diameter. The shapes required involved so much labor that the casting proved cheaper. Rotors as large as this but of a more simple design have been constructed of welded designs. The direct current motor rotor shown in another illustration is subjected to very high stresses, being used on steel mill reversing mill motors. Welded construction is the most economical for this type of design except on the smaller sizes, which are made of cast steel.

Another photograph shows two castings which are used in a 350-hp. high-speed railroad diesel engine. The walls in these castings had to be very thin, 5/16 in., in order to save weight. It was found to be more economical to make the lower piece, or bedplate, of welded construction. The design consisted mostly of flat thin walls which made their replacement with plate construction fairly simple. There are so many intricate shapes in the upper casting that it was not found feasible to weld it even if combinations of castings, forgings and rolled plates were used.

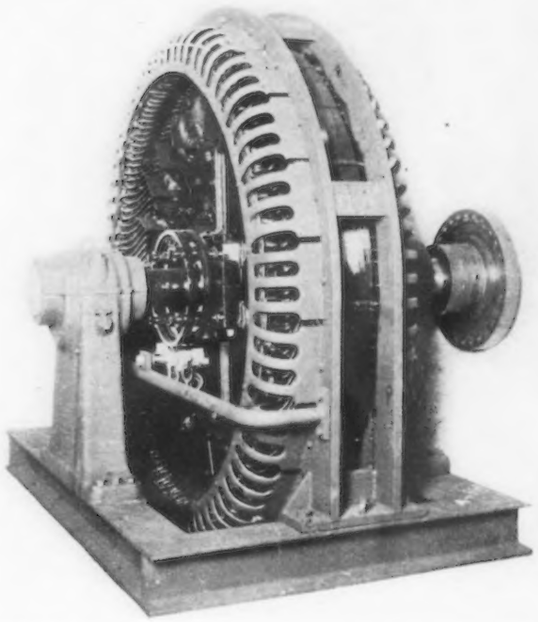
Combining Steel Castings with Fabricated Structures

Very often the cost of a welded structure is increased very materially because some parts of it are quite complicated and require a relatively large amount of labor. The logical thing to do here is to construct these parts of steel castings and then weld them in place. Cast steel with a carbon content of 0.30 per cent and under can be welded as successfully as the rolled steel. Higher carbon and alloy steels can be used if the proper welding procedure is used.

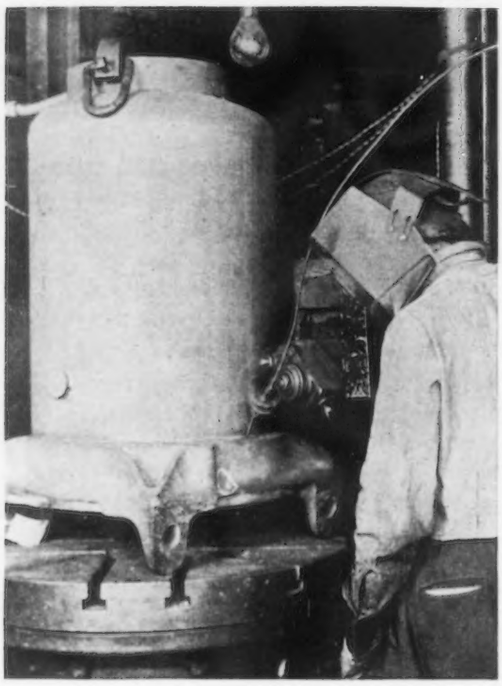
One of the illustrations shows a circuit breaker tank with a cast steel ring being welded to its top rim. Various pockets and brackets are combined into the single casting. It is machined and drilled complete and then welded to the tank. The tank is rotated by the turntable shown and the weld deposited by the automatic welding head. This form of construction insured a good gasket fit for the



This direct-current rotor, used on a steel mill reversing mill motor, can be made most economically of welded steel except in the smaller sizes, which are made of cast steel.



THIS synchronous motor is made in quantity. The bearing pedestal is an iron casting. It has been found that bedplates of welded construction are most economical regardless of the quantity involved.



Circuit breaker tank being welded to a cast steel ring.

top as well as low manufacturing costs.

In making welded steam turbines there are several points where castings are used to advantage. Some of the parts with cored passages are cast and then welded to the rest of the structure.

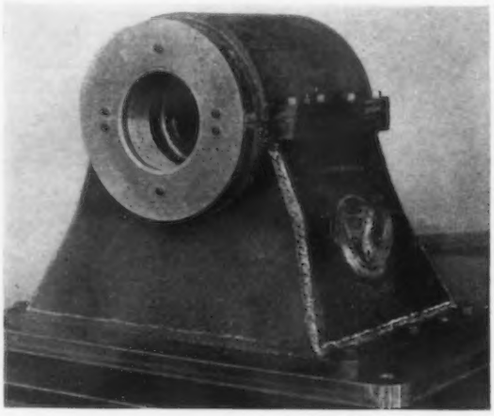
The locomotive frame shown was constructed by welding the cross ties to the two side frames. The brake hanger lugs and other small castings were also welded in place.

In the case of the main frames of gyroscopes used to control the oscillations of large ships the main trunnion supports are steel castings welded to the main fabricated structures.

Pattern Designs Can Be Simplified

Welded construction has unquestionably taken a definite place in machinery construction but there is no doubt but that some of the features which make it economical can also be used to lower foundry costs. The welded designs are inherently simple with straight sides, small radii at corners, few holes and other features which would lower pattern and molding costs.

The recent increase in the use of welded structures is due to the data on improved welding methods and design suggestions which have diligently been called to the attention of engineers. Foundry practice is so old that it has been more or less taken for granted, and a great deal of benefit would be derived if more attempts were made to assist designers with suggestions enabling them to take advantage of modern foundry methods.



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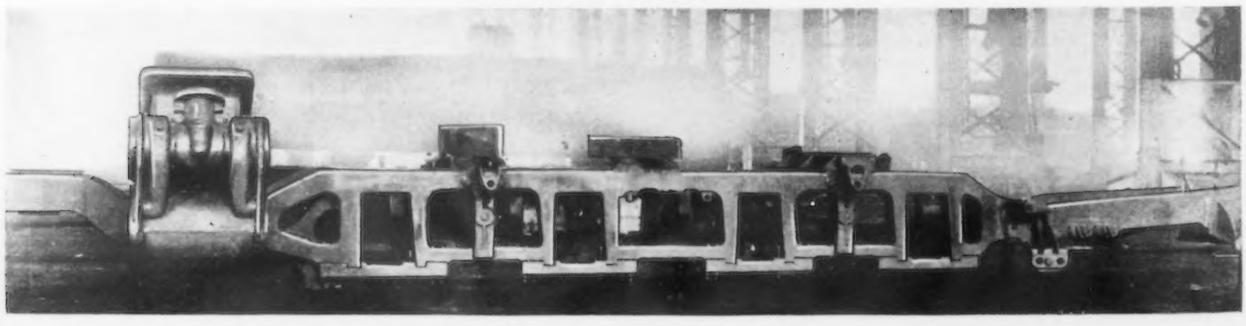
THIS bearing pedestal of welded construction can be made more economically by casting it if more than four of one design are needed.

* * *

Locomotive frame constructed by welding cross ties to the two side frames. Brake hanger lugs and other small castings were also welded in place.



ASH IS BEST MEASURE OF VALUE OF BLAST FURNACE COKE

By ROY P. HUDSON
Chemist, Elk Horn Coal Co.,
Wayland, Ky.

IT has long been known that, other things being equal, the value of blast furnace coke varies inversely with each increment of ash. Practically the only impurities in coke applied to the production of basic pig iron are ash and sulphur, ordinary good coke containing about 10 per cent ash and 1 per cent sulphur. Ralph H. Sweetser illustrated the negative economic value of 1 per cent of ash in coking coal, in a paper before the American Institute of Mining and Metallurgical Engineers several years ago, as follows:

Comparison of Pig Iron Costs

Ash in Coal, Per Cent	Ash in Coke, Per Cent	Fixed Carbon in Coke, Per Cent	Coke per Ton of Pig Iron, Lb.	Tons of Pig Iron in 24 Hr.
6.00	8.70	89.80	1,800	365.0
7.00	10.15	88.35	1,860	353.2

COKE WITH 8.70 PER CENT ASH	
Ore mixture, 4144 lb. or 1.85 tons at $5.50	$10.17
Coke, 1800 lb. or 0.90 tons at $6.50	5.85
Limestone, 1000 lb. or 0.50 ton at $1.50	0.75
Labor, $365 a day on 365 tons	1.00
Supplies and service, $250 a day	0.68
Overhead, $200 a day	0.55
Reserve for relining and depreciation	1.00
Total	$20.00
COKE WITH 10.15 PER CENT ASH	
Ore mixture, 4144 lb. or 1.85 tons at $5.50	$10.17
Coke, 1860 lb. or 0.93 ton at $6.50	6.05
Limestone, 1034 lb. or 0.517 ton at $1.50	0.77
Labor, $365 a day for 353.2 tons	1.03
Supplies and service, $250 a day	0.71
Overhead, $200 a day	0.57
Reserve for relining and depreciation	1.00
Total cost with 10.15 per cent ash	$20.30
Total cost with 8.70 per cent ash	20.00
Increase in cost	$0.30

Evidently an increase of 1 per cent ash in the coal mixture causes an increase in the unit cost of coke, limestone, labor, supplies and service and overhead, aggregating 30c. a ton. To have the same pig iron cost when using the higher ash coke, the cost of coke per ton of pig iron would have to be 30c. less, or $5.75. This would make the delivered cost of a ton of coke $6.18. Thus, an additional 1.45 per cent ash in the coke has a negative value of 32c. per ton of coke, and the negative value of 1 per cent ash in the coke is 22c.

Since in this instance the oven yield is 69 per cent, the coal containing 6 per cent ash is worth 15c. a ton more than the coal which contains 7 per cent ash.

In these calculations, Mr. Sweetser has assumed that the coke contains 1.50 per cent volatile matter, and that the furnace consumes 657,000 lb. of coke every 24 hr., irrespective of the percentage of ash in the coke. The amount of carbon required to melt the slag due to ore, and to reduce, impregnate and melt pig iron of a given composition, remains constant for a given set of conditions.

But the amount of fuel required per ton of iron varies with the available carbon of the fuel, and this in turn depends upon ash content. As the fuel required per ton of iron increases, while the fuel burned per unit of time remains constant, there must be a corresponding reduction in output. In the case here given the reduction is 11.8 tons of pig iron a day, due to increased ash.

With each addition of fuel more limestone will be required to flux its ash. Each pound of slag thus formed requires approximately 0.25 lb. of carbon to melt it, equivalent to about 0.30 lb. of coke. The effect of an increase in the ash content of coke is therefore cumulative and very detrimental to economical production.

Origin of Ash

ASH in coke is composed of the ash inherent in the coking coal and the extraneous ash contaminating the coal. It has been suggested that this extraneous ash, or high-gravity material, tends to cause cross-fractures during coking, which result in smaller and weaker coke. I do not know whether or not this is a correct assumption.

On the other hand, one of the best blast-furnace men in this country, who has been able to produce pig iron with a remarkably low fuel consumption, has contended that the high-gravity material is really an asset and that it has a tendency to make a stronger coke. I have examined coke which contained only 6 per cent ash and it was apparently as strong as cokes containing 10 or 12 per cent ash. It is probable that all of the 6 per cent ash is inherent ash.

I am inclined to believe that the objection to high-gravity material is due to its fluctuation in amount and not to its character. A coke with a uniformly high ash content is a better coke than one with a fluctuating percentage of ash; but it is better to have the coke ash uniformly low. I can see no reason why a coke containing 4 per cent inherent ash and 4 per cent extraneous ash would be a better or worse coke than one containing 8 per cent inherent ash.

Shatter Tests Not Conclusive

Physical strength of coke has probably been underestimated by those who have not given the matter sufficient thought. There is a wide variation in the comparative strength of cokes as revealed by shatter tests; but whether or not we can correlate such tests with furnace performance is somewhat doubtful. The design of modern blast furnace plants has taken into consideration the breakage of the coke, and this has been reduced to

such a great extent that the coke is now charged into the furnace with hardly a greater degree of fineness than it possesses in the railroad cars in which it is delivered. The drops from cars to bin, from bin to scale car, from scale car to skip, and from skip to receiving hopper and finally into the furnace have been greatly reduced.

There remains, however, the matter of coke crushing under the burden. To me it seems certain that ordinarily good coke never crushes in the furnace. Such cokes will withstand crushing stresses of several hundred pounds per square inch without difficulty. And the pressure of the stock column is said never to exceed 35 or 40 lb. per square inch.

It is probable that as coke becomes stronger, and therefore harder, its resistance to the solvent action of the CO_2 in the ascending current of gases rises. Consequently a greater portion of hard coke reaches the hearth than is the case when a more porous coke is used. Solution loss is higher with high pressures than with low pressures; therefore soft coke dissolves worse in large furnaces using heavy pressures. Hard coke resists this tendency much better and is therefore better for such furnaces, but the reason for its superiority is not its physical strength but its resistance to solution.

What Holds Up the Burden

The support of the charge column is made up of at least four elements: Upward pressure of the gas; friction of the charge on the sides of the shaft; vertical upward thrust against the charge from converging slope of bosh walls; flotation in the molten mass of iron and cinder in the hearth.

To these we might almost add a fifth, the dragging of the pasty zone against the walls at the top of the bosh; but this may be counted as a part of the friction, especially as we have no way of measuring either. It is ordinarily assumed that the weight of the charge column is 50 or 100 lb. per square inch, but this appears not to be true.

Effect of Sulphur

SULPHUR, the most undesirable element encountered in ferrous metallurgy, is indirectly responsible for most of the difficulties in blast furnace operation. As practically all of the sulphur in the charge comes from the fuel, the percentage of sulphur in blast furnace coke is of great importance. It ranges from 0.50 to 1.50 per cent, or higher, but most good cokes contain about 1 per cent.

Since the iron must contain not more than 0.050 per cent sulphur, almost all of the sulphur present in the fuel must be eliminated by the slag. Sulphur may be eliminated by volatilization to some extent, but in good practice the greater portion of it leaves the hearth with the slag.

Blast furnace operators desire a coke containing not over 10 per cent ash and 1 per cent sulphur. In ordinary basic practice approximately 1800 lb. of such a coke will be required to produce a ton of pig iron. With ores of ordinary gangue content the slag volume per ton of iron will be approximately 1000 lb., and the sulphur content of the slag will be 1.80 per cent. This is about the maximum sulphur-carrying power of slags of ordinary basicity.

Limiting Conditions

Hence the substitution of a coke containing more than 1 per cent sulphur requires an increase in the volume of slag produced per ton of iron. This requires additional coke, which in turn requires more limestone and produces more slag, and so on. Thus the fuel consumption is considerably increased, due to the increase in slag volume necessary for removal of the extra sulphur.

It is a fact that a coke containing 0.50 per cent sulphur has no more value than a coke containing 1 per cent sulphur. The negative value of sulphur is not evident until its percentage in the fuel is high enough to demand an increase in slag volume. However, when this condition is reached, the negative value of sulphur is at once apparent, and it is probably greater than it is generally supposed to be. T. L. Joseph has stated that, from the saturation point on, the cost of removing each 0.1 per cent sulphur ranges from 13c. to 28c. per ton of iron, depending on conditions. George S. Scott found that, by assuming that the slag would carry with safety 1.67 per cent sulphur, there was no advantage in decreasing the sulphur content of the coke below 0.91 per cent.

Comparative Value of Coke and Ore

DURING the last few years, remarkable advances made in the preparation of metallurgical coal have resulted in lower-ash coke than we have ever had. Simultaneous with the advent of purer fuel has been a gradual but decided decline in the iron content of Lake Superior ores, accompanied by an increase in their silica content. Ralph H. Sweetser has stated that apparently the increase in the silica content of the ores has been counterbalanced by the decrease in the percentage of ash in the coke, and by the progress made in the art of smelting iron ores. I am inclined to agree with this view.

In his paper (in *Mining and Metallurgy*, September, 1930) Mr. Sweetser gives a comparison between the work of the Dover furnace at Canal Dover, Ohio, in 1896 and the work of a Columbus, Ohio, furnace in 1930. The production records of the Dover furnace were originally given by Arnold K. Reese, before the American Institute of Mining and Metallurgical Engineers.

Previous to the publication of Mr. Sweetser's paper I made some calculations which lead to the conclusion that each 1 per cent increase of ash in the coke requires 43 lb. of additional coke per ton of iron, and each 1 per cent increase of silica in the iron ore requires 27 lb. additional coke per ton of iron.

The increase in the average silica content of Lake Superior ore from 1902 to 1928 was 2.20 per cent, which according to my figures requires 59 lb. more of coke per ton of iron. This increase in the silica content of the ore can be offset by a decrease of 1.4 per cent ash in the coke, or 1 per cent ash in the coal. There can be no doubt that the average reduction in the ash of coking coal during the last 26 years has been greater than 1 per cent.

Combustibility of Coke

TO guard against the possibility of confusion, my definition of "combustibility," in terms of blast furnace operation, follows:

Combustibility of coke is the average rate of gasification of coke per unit volume of the combustion zone of the furnace.

This conception assumes a tuyere of given dimensions and a constant weight of blast per unit of time.

It is common knowledge that with certain types of coke a furnace will drive more rapidly. This is generally assumed to be due to the greater combustibility of the fuel. However, the rate of driving is generally interpreted in terms of the number of skip loads of coke which the furnace will take in a given time. This is a matter quite independent of combustibility and due entirely to the apparent specific gravity of the coke. In modern practice the coke is charged by volume, instead of by weight; for this reason an increase in the amount of coke charged in a given time may lead to erroneous conclusions.

On the other hand, a spontaneous increase in the rate of driving may indicate that the solution loss has in-

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Roll Formers Designed to Permit Ready Adaptation to Particular Needs

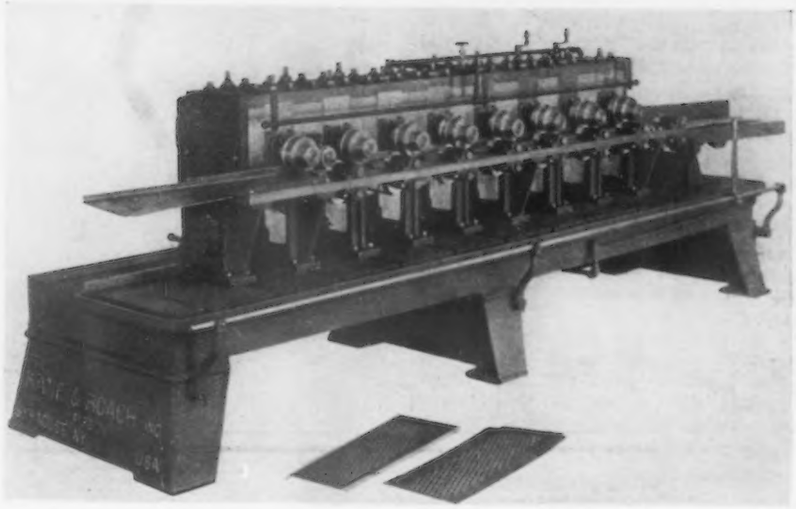


FIG. 1

THE new series L cold roll formers here shown were developed by Kane & Roach, Inc., Syracuse, N. Y., in recognition of the fact that for each type of section to be rolled and each class of shop using such machines there is a type and size best suited for the work. Flexibility—maximum adaptability of the basic design to meet particular requirements—is, therefore, a major feature of these machines.

In Fig. 1 is shown one of the modified roll formers as furnished to the Soviet Union for hemming the running boards for the Ford model A automobiles being built in Russia. Being a single-purpose unit, it required no elaborate gearing. The drive from the motor is by silent chain to a roller bearing clutch idling sprocket mounted on an extended worm-shaft. The housings are arranged in double-stand units, each of which consists of two upper and two lower shafts, the two lower shafts being driven by spur gears from an intermediate shaft that carries a bronze worm gear. The hardened and ground worm that drives the worm gear is mounted in roller bearings retained in the main frame. The top roll shafts are driven by spur gears meshing directly with those on the bottom roll shafts. A removable hand crank with automotive type spiral kick-out is also used.

Roller bearings are used throughout and all gears are inclosed in oil-tight cases and run in an oil bath. The multiple-disk clutch driving chain, and the coolant pump and its drive are entirely inclosed. The tank for the coolant system is accessibly mounted on the back of the bed-plate. The coolant is pumped to the piping over the rolls; after flushing the rolls it returns through a drain-trough and piping to the tank.

Top bearings are adjusted by means of lift screws; they are of one-piece type containing both bearings in a single casting, rigidly tied together by a center connecting barrel which acts as a grease reservoir. The clutch shifter rod of the machine is equipped with lever at the feed end, but may be operated from any point along the bed of the machine.

Another adaptation of a series L machine to meet specific requirements

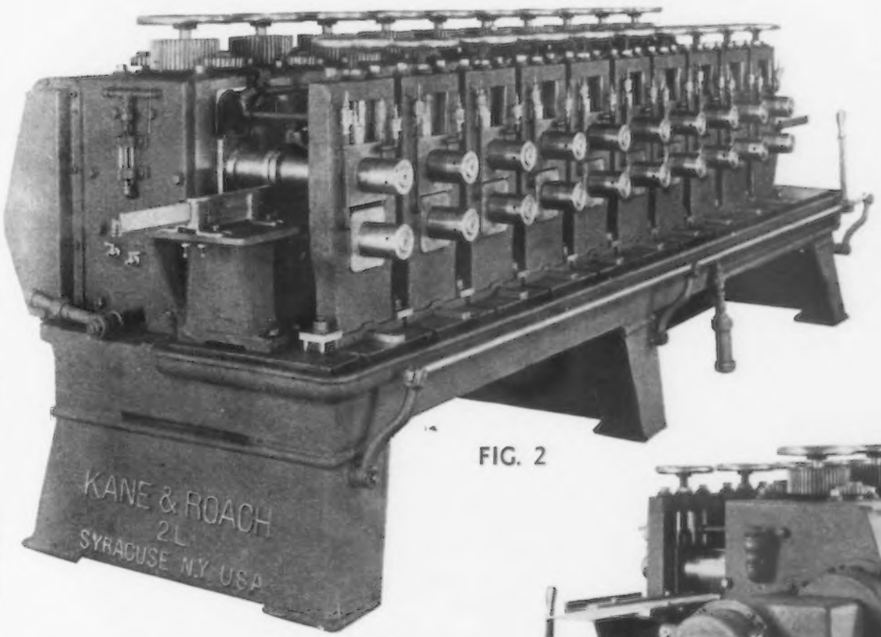


FIG. 2

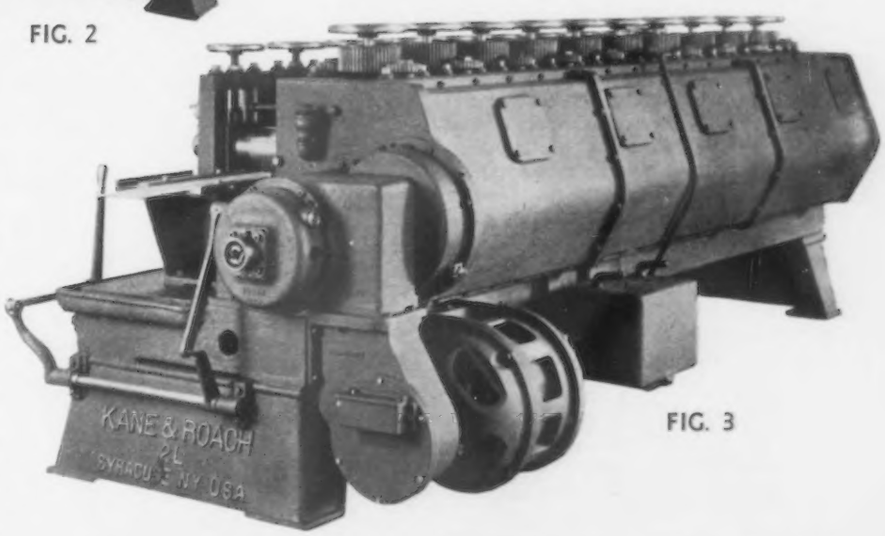


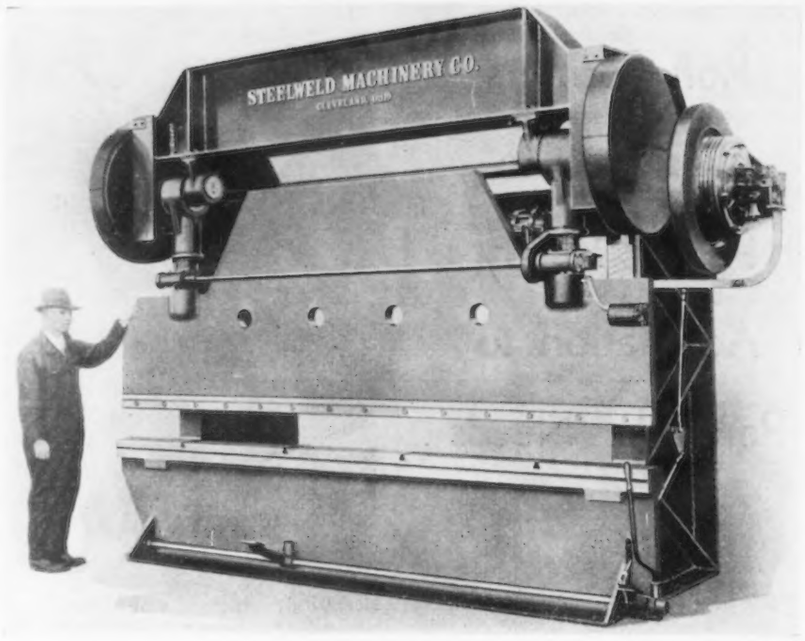
FIG. 3

is shown in Figs. 2 and 3. In this machine "square" gearing is employed to cover the range of depth of sections required. The outboard housings are adjustable for the width of sections, and the upper shafts are quickly adjustable by handwheels through spur gearing. To meet the users' preference no spur gears were overhung and the primary drive had bevel instead of spur gears. Housings, bed-plate, legs, coolant system and clutch mechanism are virtually the same as in the machine shown in Fig. 1, but gear cases on the back of the machine had to be different. In addition to bevel pinion shaft bearings, the bevel gear drive required use of an additional spur gear reduction between the clutch shaft and the bevel pinion shaft.

"Square" gearing provides generous adjustment of the vertical center distance of the rolls without losing the practical working mesh of the gear teeth. Therefore shallow shapes can be formed economically on rolls of small diameter and deep sections on the large diameter rolls, without any change in gearing or other parts of the machine. On the other hand, when extremely deep shapes are formed, or a section becomes deep in the last few rolls only, as many of the top rolls as required can be quickly converted into direct drive. This permits small diameter rolls to be used to a greater extent, resulting in most cases in a marked saving in cost of rolls. Then, the square gearing generally allows the rolling of deeper sections for which a larger machine of direct mesh type would ordinarily be employed.

Arrangement of the gear cases, clutch and chain covers, motor and coolant tank of this machine is shown in Fig. 3. The lubrication system includes a small gear pump submerged in the oil reservoir, the lubricant being forced through a pipe line equipped with gage glass, to the top roll shaft bearings in the main housing gage glasses and try cocks are provided at the front of the machine, as shown.

With the exception of the bronze roll shaft bearings, roller bearings are used throughout the drive. Outboard housings are readily removable; the housing bearings are lubricated from sight-feed oilers, so that in changing over no oil lines need be disconnected. Where several different sections are to be rolled, the machines are provided with means for recording pressure settings, so that when changing from one job to another little time is lost in making proper pressure settings on every stand of rolls for each shape.



New Bending Brakes Have Housings of Welded Steel

A LINE of bending brakes with housings of built up welded steel sections, providing, it is claimed, a frame construction of unusual strength and rigidity has been brought out by the Steelweld Machinery Co., Cleveland.

The stressed members in the throat are very heavy and are so designed that deeper throats may with safety be supplied. Following the usual design power is applied to the ram through overhead eccentrics. Both the ram and bed are of ample depth and are overhung at one end; this, it is pointed out, being an advantage in doing jobbing work and providing large die surface for narrow work.

The clutch is of the twin-disk type. Operating levers are mounted in ball bearings to eliminate friction and to reduce fatigue of the operator. Unusual ease and speed of operation are advantages claimed for the machine. All the gears are of steel, the high-speed gears being of the Sykes herringbone type. Ample bearing area is provided on both sides of the eccentrics, giving a double bearing to each gear. The ball joint connection is said to be unbreakable in service. The slide bearings and eccentric straps are of Meehanite iron castings. The flywheel is of rolled steel and is mounted on Timken bearings. The flywheel shaft is of high carbon alloy steel with the pinion forged integral. Eccentrics are forged solid with the main shafts. Adjusting screws are heat-treated high carbon steel.

The ram is electrically elevated and is self-locking. A foolproof feature is the arrangement whereby the motor will stall before damage occurs to the mechanism. Lubrication is with oil or a pressure grease system from a central point. The Steelweld company, which manufactures bulldozers, will make the new line of brakes in all sizes.

Improved Three-Finger Automatic Hone

IMPROVEMENTS in the three-finger automatic hone, model IA-O-F, made by the Micromatic Hone Corpn., Detroit, include use of soft-steel folded-edge stone shells, said to increase the life of the stone some 40 per cent, to correct uneven wear and to eliminate the possibility of cylinder wall scoring.

Other improvements made to increase the efficiency for fast multiple-spindle operation include drive ball solid on drive shaft, increasing strength; all wearing surfaces carburized, hardened and ground; addition of recoil spring to insure quicker and more positive collapse; wider

bearings on bodies and flanges for better fit and easier assembly.

The basic principles of design and construction have not been changed. The single cone principle of expansion is retained as giving close accuracy and quick removal of stock. This single cone contacts each individual stone holder at only one point, the center. Consequently, each stone rocks independently of the others and compensates for uneven stone wear. Steel fingers, entering into an extended guide bushing, control the expansion and contraction of the cone, which in turn controls the stones.

A feature emphasized is that the stones are mounted in soft steel stampings which are discarded when the stones wear out, thus avoiding the need for a stock of extra stone holders and simplifying stone replacements.

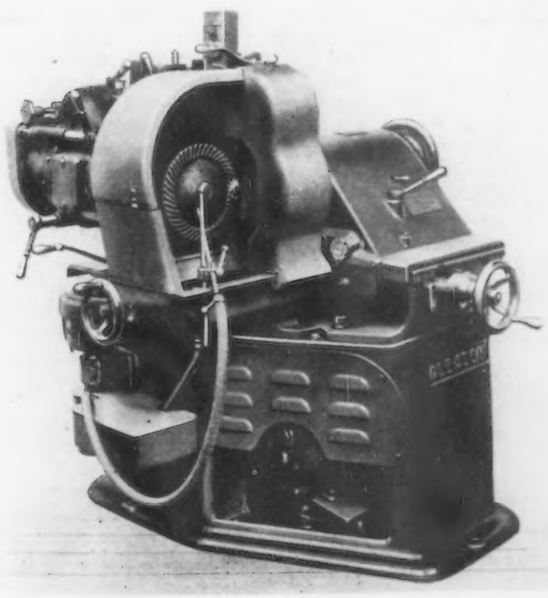
Burnisher Smooths Out Cutter Marks on Spiral-Bevel Pinion Teeth

ELIMINATION of the possibility of burnishing "lameness" into the pinion teeth and spoiling the work is emphasized by the Gleason Works, Rochester, N. Y., in announcing its new No. 18 spiral bevel pinion burnisher. A slight adjustment is provided to permit concentrating the burnishing operation on either the toe or the heel if it is desired to change the location of the tooth bearing.

Burnishing spiral bevel pinions on this machine, which is similar in construction to the company's 18-in. combination testing and lapping machine, consists of running a soft steel pinion in mesh with a hardened mating gear to smooth out any cutter marks on the tooth of the pinion. It is not intended to compensate for poor gear cutting. The gear and pinion are held in proper contact under pressure and instead of the rocking motion formerly used, the teeth are given a slight movement lengthwise of the face.

The relative motion between the gear and pinion is obtained in the same manner as the lapping motion on the lapping machine. The pinion drives the gear and as the two rotate the position of the gear is changed continuously and automatically to effect a combined horizontal and vertical movement of the gear relative to the pinion. As the position of the gear is changed, the pinion, which is held in mesh by a spring, moves in and out with the gear, resulting in an "in and out" movement of the pinion with reference to the gear axis. The machine can be equipped for automatic chucking and dechucking of both the gear and pinion, and with "in and out" movement of the pinion head for loading and unloading.

The spindle on which the pinion is mounted can be run in either direction. The spindle head is clamped directly to the frame and is adjusted horizontally with a handwheel and lead-screw. A slight angular adjustment permits changing the position of the pinion to throw the bearing toward either the toe or the heel. The driven head is mounted on a column which is adjustable horizontally on the frame the same as the drive or pinion head. It is also adjustable vertically on the column for burnishing hypoids. An adjustable backlash brake on the spindle maintains an even load during the burnishing operation.



THE burnishing consists of running a soft steel pinion with a hardened mating gear.

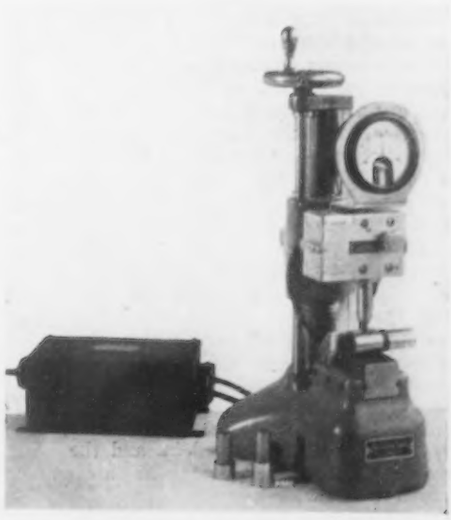
Electric Gage for Rapid External Gaging

AN adaptation of the Electrolimit gage in the form of a comparator for external gaging has been announced by the Pratt & Whitney Co., Hartford, Conn. The new instrument, with capacity of 4 in., is offered for rapid and accurate inspection of production work. It comprises a cast-iron base carrying an anvil and a column. The anvil, made of hardened steel, chromium plated, has a corrugated surface 1½ x 3½ in., and on the reverse side has a V-block. It can be removed easily and anvils, furnished to meet special requirements, can be substituted. An adjustable backstop facilitates the gaging of cylindrical parts.

Rigid construction is a feature. The column that carries the gaging head is a heavy chromium-plated hollow steel cylinder and is firmly mounted and fastened to the base, the base being ribbed to add further to the rigidity. The power unit contained in the enameled metal box shown at the left of the instrument is the only electrical equipment necessary to plug the gage in on a 110 volt, 60 cycle line. This unit contains a transformer, which reduces the circuit to the 10 volts required to operate the gage head, and a voltage regulator which reduces the inaccuracies caused by fluctuations in line voltage to about one millionth of an inch for each volt change.

The DO-14 micro-ammeter mounted on the gaging head has a 2¼-in. scale. The standard magnification of the circuit will cause the needle to travel about 7/16 in. for each 0.0001 in. variation in the sizes of the parts gaged. Magnification can be increased or decreased as desired to suit special conditions.

This gage is particularly adaptable for the inspection of parts to close limits and the chromium-plated anvil, the tungsten-carbide or diamond gag-



ELECTRO-LIMIT gage (at right) in use in wristpins. Maximum and minimum setting plugs are furnished for calibrating the instrument.

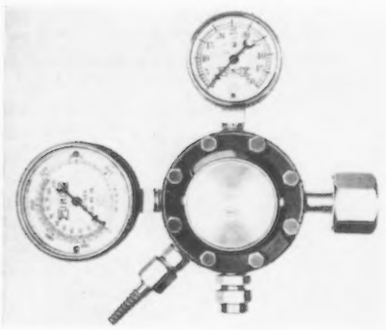
ing contact point, and the complete elimination of bearings, gears, pinions, racks, etc., are emphasized as assuring continuous accuracy.

The Electrolimit gage principle comprises a mechanical gaging contact which controls an electric circuit in such a manner that work errors are shown in a greatly magnified and visible form on a micro-ammeter. The gage is made by the Pratt & Whitney Co., and the electrical parts by the General Electric Co. The human element is entirely eliminated, because the gaging pressure remains exactly the same as the pressure with which the gage is set initially. High magnification eliminates uncertainties and chances for observational errors.

New Oxygen and Acetylene Regulators

THE improved Purox oxygen and acetylene regulators brought out by the Linde Air Products Co., 30 East Forty-second Street, New York, supersede the company's former line of Metal Master type regulators. The series comprises six regulators, designated as Nos. 33 and 34, for acetylene, and the Nos. 13, 14, 23 and 24, for oxygen.

The regulators are of all-metal con-



struction. An outstanding feature is an accurate self-alining valve of the nozzle and yoke type, insuring sensitive action and freedom from leakage. Simplicity of construction eliminates any need of disturbing the diaphragm, bonnet, pressure adjusting screw, or pressure adjusting spring when replacing a worn valve seat. Access to the interior of the regulator is gained by merely removing a plug in the rear of the body. The seats are made of a material not easily marred or scratched by foreign particles.

Diaphragms are made of a special corrosion-resisting alloy assuring long life, and may be replaced easily without special tools. A rupturing disk safety release on the oxygen regulator provides protection to the diaphragm should an abnormal pressure occur. Gages are made to withstand the rough usage of field work. The working pressure gages are 2 in. and the cylinder pressure gages 2½ in. in diameter.

Bench-Type Tumbler for Small Quantities

BENCH-TYPE oblique tilting tumblers designed for small quantities of work have been added to the line of the Baird Machine Co., Bridgeport, Conn. They can be driven by belt or motor and used for various processes of tumbling, including ball

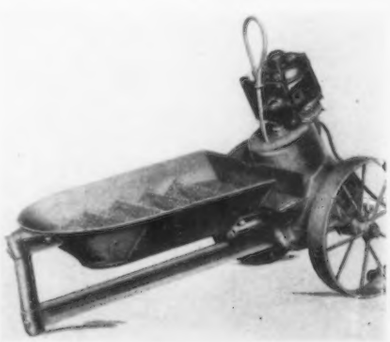
burnishing. They are suitable for laboratory work.

The barrel of the unit illustrated is made of cast metal, but barrels made of different materials and of different shapes and sizes can be furnished. More than one barrel can be used on one tumbler. The barrel is held by a simple notched segment and locking bar arrangement. It can rotate at any one of eight angles, from vertical to 20 deg. below horizontal. The shafts are bronze bushed and oiled automatically. The bevel gears run in a bath of oil.

Bench space of 12 x 17 in. is required for the motor-driven machine, which employs a ⅛-hp. 1725 r.p.m. motor. The height to the top of the barrel is 19 in. With barrel and motor the weight is 130 lb. Barrel capacities range from 2 to 3 quarts and the maximum combined weight of barrel and contents is 60 lb.

Portable Sand Screener and Aerator

FOR sand screening, blending, aerating and throwing, a new portable unit, termed the Screenarator, is offered by the Beardsley & Piper Co., 2541 North Keeler Avenue, Chicago, as equipment for preparing

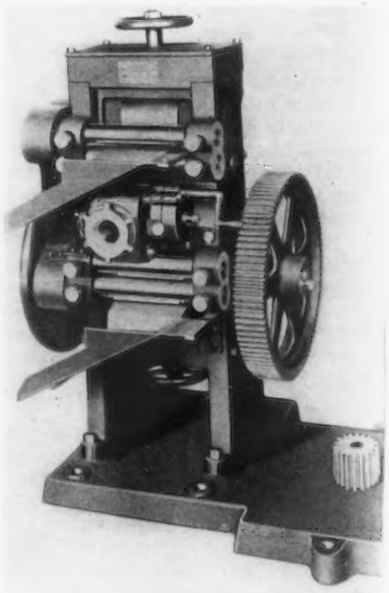


heap, facing and core sand, and for miscellaneous sand conditioning jobs in the foundry. Operation is simple; sand is shoveled on to a ridged reciprocating screen and, after being thoroughly broken and aerated, drops into a hopper below. From the hopper, the sand is conveyed by gravity, assisted by the reciprocating motion, to the rotor housing where a series of paddles, revolving at high speed, mix and blend the sand, expelling it in a fluffy pile at the front of the machine. Refuse in the sand is eliminated through a chute at the side.

Mounted on two wheels, the machine is easily portable; it is designed to combine strength with lightness.

Lead Stripping Machines for Round or Oval Cables

THE improved lead stripping machine illustrated features an adjustable guide and splitting head



which is suitable for all diameters of lead covering within the range of the machine. It is pointed out that, although electric wire and cable manufacturers produce round cables for the most part, they occasionally have the problem of removing the lead sheath from an oval or duplex cable. The guide and splitting head of this machine has two separate adjustments to take care of the large and small diameters of oval cables. Another accessible and quick adjustment provides for the depth of the lead splitting knives. The machine, a product of the John Robertson Co., 121 Water Street, Brooklyn, N. Y., is also adapted to the needs of manufacturers of rubber garden hose who are using the lead encasing process. It is said that adjustments for different diameters of hose can be made in a few seconds and that guide bushings are not required.

Congress May Bar Foreign Steel in Government Construction

President's "Buy American" Recommendation Focuses Attention on Bills Now Pending to Favor Domestic Materials

WASHINGTON, Feb. 4.—The movement to confine Federal Government requirements to domestic materials so far as possible has been stimulated as a result of the "Buy American" communication of President Hoover addressed to Speaker of the House Garner on Jan. 26.

Steel and other manufacturers have urged this policy for a long time. They have pressed its necessity, since the depression developed, as a means of providing them with much-needed business and also of furnishing employment in the manufacture and installation of the material. Federal building inspectors have been on the alert for foreign steel partly because of present requirements of the law that preference be given to domestic steel. They have been additionally watchful by reason of the activity of the Concrete Reinforcing Steel Institute, which has complained of the use of foreign reinforcing bars bought by contractors having Government contracts.

It is doubtful that much foreign steel has gone into Government projects, which have been and are extremely heavy in connection with the construction program, enlarged in an effort to aid industry and employment. Nevertheless, there have been instances of the delivery of foreign steel for Government work. The latest known case was that of a small lot of channels which had been purchased by a plaster contractor for use in the House office building, though neither the jobber supplying the steel nor the contractor buying it was aware that it was not of domestic manufacture. Through the activity of the Concrete Reinforcing Steel Institute, the tonnage was suspected to be of foreign origin and since neither the contractor nor jobber could give an affidavit to the contrary it was rejected by the office of the Capitol architect and replaced by domestic steel. This incident has resulted in notices being sent out by the Capitol architect to inspectors requiring them to observe markings on steel to see if it is of domestic or foreign manufacture. Since much steel is not marked, the burden of proof that it is not of foreign origin is placed upon the supplier.

The Tariff Act provides for the marking of the country of origin of many products, and some steel interests have tried to make it applicable to all imports of steel. But objection has been made successfully so far that it is not practicable to mark all rolled steel. By placing the burden of proof upon the supplier, however, it is hoped to offset this objection to an important degree at least.

Domestic Interests Protest

Protests have been made by domestic interests, however, that prevailing law does not go far enough to furnish adequate protection against the use of foreign material in Government work. It is reported that these protests partly prompted the President's letter to Speaker Garner, which seeks further legislation. The President recommends legislation providing that in advertising for proposals for supplies, heads of departments shall require bidders to certify whether the articles proposed to be furnished are of domestic or foreign origin and shall, if the excess of cost is not unreasonable, purchase domestic materials, "notwithstanding that articles of foreign origin may be offered at a lower price."

The President says it would be of substantial advantage to American manufacturers and producers if Congress should authorize all departments and executive establishments uniformly to give them preference such as is afforded by special provisions of the Army and Navy appropriation acts. The same provision is also carried in the Shipping Board appropriation act. Specifically this provision gives preference to domestic materials, "conditions of quality and price, with duty, being equal." The provision further points out that "Unless otherwise stated in the bid, it will be understood that domestic articles or materials only will be used, unless: They are of better quality; or, being equal in quality will be furnished at lower cost to the Government; or domestic articles or materials not available."

Bills Are Now Pending

The President's proposal is not as far-reaching as some of the bills which have been introduced. But it has two features that are held to be particularly desirable. One is the setting up of a uniform law for all Government purchases. The other is the giving of preference to domestic materials, assuming the cost is not unreasonable, even if the price is higher than the foreign price. This latter feature goes beyond the existing provisions in the Army, Navy and Shipping Board appropriation acts. Apparently, however, the President's proposal does not reach one extremely important point. It seems to cover only direct purchases of materials by the Government, as do the existing special provisions for preference to American products. These provisions have been helpful and turned a great amount of business to American manufacturers that otherwise would go abroad. These provisions nevertheless do not reach to contract work, involving huge outlays for construction works of all kinds.

One of the strongest bills covering the purchase by the Government of domestic materials was introduced at the previous session and reintroduced at the present session of Congress by Mrs. Florence P. Kahn, Republican representative from California. Containing less than 100 words, this bill requires that all supplies purchased by the Government and furnished by contractors doing Government work be of domestic origin. It carries three rather obvious exceptions: Materials which cannot be purchased in the United States; materials purchased for experimental purposes and material of foreign production authorized by law. This bill not only calls for domestic material, whether purchased directly or indirectly, but it makes no mention of price. A bill almost as broad has been introduced by Representative White, Republican, of Ohio. It would direct members of the cabinet, in the expenditure of appropriations, to buy only domestic materials, notwithstanding they may cost more, if "such excess of cost be not unreasonable," and provided that the materials are competitively produced in the United States. The cabinet members would be required to purchase only domestic materials, with the exceptions noted, "unless in their discretion the interest of the Government will not permit"

Hearing on Kahn Bill

Mrs. Kahn's bill and Mr. White's bill are both before the House Committee on Expenditures in the Executive Departments, of which Representative Cochrane of Missouri is chairman. He has advised Mrs. Kahn that he will hold a hearing on her bill first. Hearings on other bills may not be necessary.

Other important legislation regarding Government purchases is proposed in bills introduced by Senator Blaine, Progressive Republican, of Wisconsin, and Representative Christopperson, Republican, of South Dakota. These bills are identical and would establish uniform requirements affecting Government contracts. The measures are the result of studies made by the Bureau of the Budget. They are intended to set up uniform specifications, which naturally would fit American production, and to eliminate inequalities in the purchase of materials by different departments and bureaus. The varying purchasing provisions would be repealed and the one uniform law substituted.

Philadelphia Foundry Activity Declining, Nine-Year Survey Reveals

At the regular monthly meeting of the Philadelphia Foundrymen's Association on Feb. 10, Robert Gray, of the Industrial Research Department of the Wharton School of the University of Pennsylvania, presented some of the results of a study of foundry activity in the Philadelphia Federal Reserve District covering the period beginning in January, 1923. The Industrial Research Department collects and analyzes each month reports from gray iron, malleable iron and steel foundries. Mr. Gray's remarks covered only trends in production, capacity, and prices in the gray iron branch of the industry, however.

He showed that the total output of 17 gray iron foundries operating outside of Philadelphia but within that Federal Reserve District had tended to decrease since 1926, but that the production of 14 plants in Philadelphia had maintained a general level of activity from 1923 to 1930. The present depression, however, had seriously affected them too. The fact that the total for the Philadelphia firms did not tend to decrease before 1930-31 can be attributed to the activity of five foundries which produced 22 per cent more in 1929 than ever before, although the other nine firms had a smaller output than previously.

Gradual Decline in Some Plants

It seems, therefore, that the present lack of activity among the Philadelphia foundries may be caused in some by the depression in general business, while in others it is the result of a gradual decline. It is doubtful that these latter firms would be much more active than at present regardless of the business cycle.

In 1923, about 60 per cent of the capacity of the Philadelphia gray iron foundries was utilized. This over-equipment has tended to increase because the activity in some plants was decreasing and because the other foundries with increasing business expanded their facilities in excess of the expansion in tonnage output.

Average Price Decreased

The average price of gray iron castings decreased from over 5½c. per lb. in 1923 and 1924 to slightly less than 5c. in 1931. This was caused by an increase in the amount of castings sold by firms whose average price was less than 5c. per lb. In 1931, this price class shipped 65 per cent of all deliveries made by the Philadelphia foundries. The decrease in price and the shift in the importance of price groups may be the result of actual reductions in price or of changes in the types of castings being made.

Because Mr. Gray was unable to say which factor caused the average price to decline, he suggested that the shipments of castings be classified in the future. A classification of shipments would also help foundrymen in estimating changes in demand caused by seasonal factors or by the long-time growth or decline in other industries. In addition, Mr. Gray suggested that the study could be improved by the cooperation of more gray iron foundries. This would enable the separation of plants into groups for smaller areas as well as into groups by types of castings or by prices. As a result, each cooperating foundry would have a more accurate standard by which to judge its own performance.

As a final recommendation, Mr. Gray suggested that the competitive branches of the foundry industry as well as competitive industries might secure similar benefits through the expansion of the study. This would involve an increase in the number of malleable iron and steel foundries cooperating and the establishment of a similar reporting system in the welded, forged and pressed metals industries. The exchange of statistics in regard to activity would be mutually helpful for the intelligent planning for the future of each individual business.

Canadian Production Much Reduced in 1931

Canadian figures on production of pig iron, ingots and castings and ferroalloys for 1931 and the two preceding years, prepared by the Dominion Bureau of Statistics, show greatly reduced output last year. The comparative figures, in gross tons, are as follows:

	Pig Iron	Steel Ingots and Castings	Ferro-alloys
1931 ...	420,038	673,087	45,371
1930....	747,178	1,009,578	65,223
1929....	1,080,160	1,378,024	89,116

Wilcox-Rich Corpn. Buys Holley Permanent Mold

The Wilcox-Rich Corpn., division of the Eaton Axle & Spring Co., Cleveland, has purchased the assets and business of Holley Permanent Mold Machine, Inc., Detroit, and also the gray iron casting business and equipment of the foundry division of the Holley Carburetor Co., Detroit. The purchase was made by the Eaton-Erb Foundry Co., Vassar, Mich., formerly known as the Erb-Joyce Foundry Co., but now a subsidiary of the Wilcox-Rich Corpn.

By the terms of the purchase, the Eaton-Erb Foundry Co. acquired the patents, patent rights, licenses, trademark and trade names of Holley Permanent Mold Machine, Inc., and becomes one of the outstanding gray iron foundries in the country, equipped to handle a wide range of gray iron castings by permanent mold methods in addition to its large volume of sand molding business. All foundry and machine equipment purchased will be transferred to Vassar, but sales offices will be maintained at the Wilcox-Rich general offices, 9771 French Road, Detroit. The manufacture and sale of permanent mold machines will be continued by the purchasers.

Frederick Erb continues as president of the Eaton-Erb Foundry Co., with J. L. Dostal, formerly general manager in charge of the sale of foundry service and permanent mold machine equipment of Holley Permanent Mold Machine, Inc., as vice-president. Other officers include F. A. Buchda, treasurer, and J. H. Bernard, secretary. The board of directors is made up of J. O. Eaton, C. W. Miller, Frederick Erb, J. L. Dostal and R. H. Daisley.

Demonstrates Electric Gaging

The Electrolimit gage—its principles and applications—was demonstrated at Chicago; Rockford, Ill.; Davenport, Iowa; and Milwaukee on Jan. 12, 13, 14 and 20, respectively, by C. V. Johnson, of the Pratt & Whitney Co., Hartford, Conn.

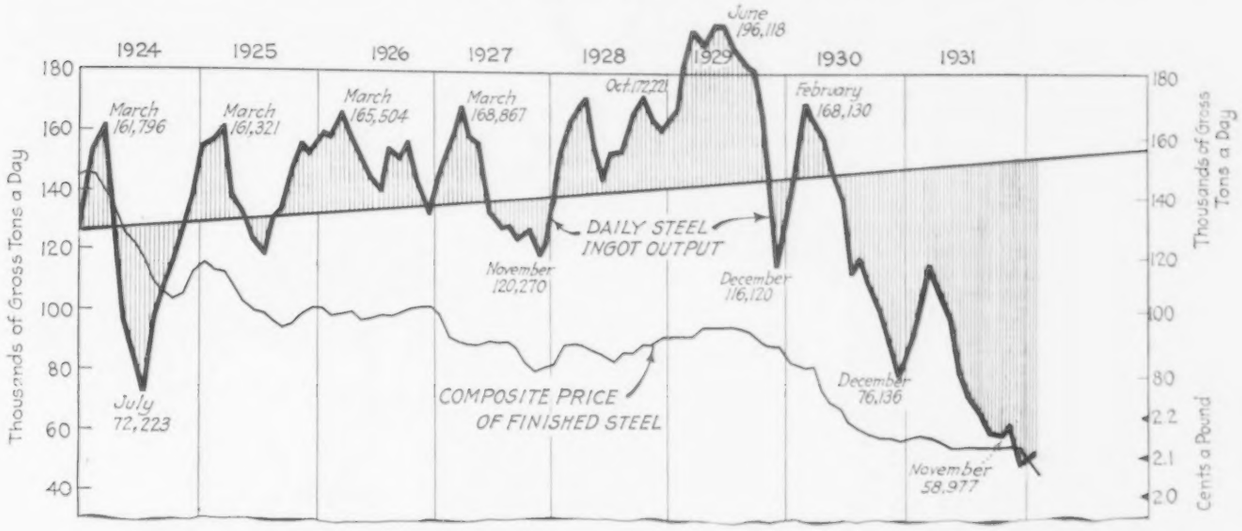
Application of the new electric gage, which employs a magnifying circuit, making errors visible in a highly magnified form, was shown as both an external and an internal comparator for bench use, as well as in continuous gaging. Other gages displayed included the P & W Supermicrometer with pressure tailstock, chromium-plated cylindrical gages, thread gages and Hoke gage blocks.

Welding Design Course Completed by 61 Students

Three months after the inauguration of the new General Electric Co. course in the design of welded steel structures, 61 students had completed the course. Of these, 27 were representatives and engineers of the company's customers and the remainder were General Electric apprentices. The average time consumed in completing the course was four weeks.

Commercial Shearing & Stamping Co., Youngstown, has received an order for 382 commercial telescoping hydraulic hoists, to be installed on trucks recently ordered by the sanitary department of New York City from the White Motor Co., Cleveland. The hoists are being turned out by the Youngstown company at the rate of 10 to 12 a day.

Steel ingot production in January showed the first gain, with the exception of last November, since March, 1931. Prices went lower in January as ingot output gained 12.2 per cent.



Steel Ingot Output Gained 12.2 Per Cent in January

STEEL ingot production in January registered a gain of 12.2 per cent over that of December, based on the daily rate, which was 56,203 tons last month, against 50,092 tons in the preceding month.

On a percentage basis, the January increase compares favorably with a 13 per cent average gain for the first month of each year during the 10-year period from 1922 to 1931, inclusive, but the January output was only about 41 per cent of the average for that month in the decade from 1922 to 1931 and the output for the past December was also only about 41 per cent of that for the final month of the year in the decade from 1921 to 1930, inclusive. The daily rate the past month was the lowest for any January since 1908.

In the 10-year period prior to this year the January gains, in percentages over December, figured on the daily output, were as follows: 1922, 18; 1923, 7.5; 1924, 18.5; 1925, 13; 1926, 4; 1927, 10.5; 1928, 26.5; 1929, 3.8; 1930, 14.5; 1931, 19.

The January total, with 26 working days, was 1,461,290 gross tons, against 1,302,399 tons in December, which had the same number of working days. January output represented an average engagement of 26.54 per cent of capacity, based on the institute's official capacity rating of 66,069,570 tons of open-hearth and Bessemer ingots a year, as of Dec. 31, 1930, whereas present capacity is probably nearer 70,000,000 tons. The percentage engagement of capacity in January, as calculated by the institute, is almost identical with the average of THE IRON AGE weekly estimates last month.

Bessemer steel showed a loss in production in January—160,633 tons against 170,546 tons in December—while open-hearth steel gained about 15 per cent.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)

	Reported by Companies Which Made 95.21 Per Cent of the 1930 Ingots		Calculated Output of All Companies		No. of Working Days
1931	Open-Hearth	Bessemer	Monthly	Daily	
Total, 1930	32,405,466	5,020,588	39,286,287	126,322	311
January	2,044,298	296,620	2,458,689	91,063	27
February	2,085,529	296,972	2,502,366	104,265	24
March	2,504,060	346,139	2,993,590	115,139	26
April	2,275,404	316,668	2,722,479	104,711	26
May	2,083,833	301,639	2,505,485	96,365	26
June	1,730,109	246,365	2,075,910	79,843	26
Six months	12,723,233	1,804,403	15,258,519	98,442	155
July	1,570,776	225,030	1,886,153	72,544	26
August	1,462,720	174,380	1,719,462	66,133	26
September	1,274,321	199,151	1,547,602	59,523	26
October	1,320,158	195,943	1,592,376	58,977	27
November	1,276,906	240,441	1,593,684	63,747	25
December	1,069,468	170,546	1,302,399	50,092	26
Total, 1931	20,697,582	3,009,894	24,900,195	80,065	311
1932					
January	1,230,661	160,633	1,461,290	56,203	26

Malleable Iron Output in 1931 Lowest in Years

WASHINGTON, Feb. 5.—Production of malleable castings in 1931 declined to 307,191 tons, the lowest output since the Bureau of Census began keeping records in 1923. The 1930 total was 515,856 tons. Bookings were 298,051 tons, compared with 475,825 tons in 1930. The December, 1931, production was 21,200 tons, increased from 17,736 tons in November, while orders rose to 19,493 tons from 18,658 tons.

The Pittsburgh district section of the Association of Iron and Steel Electrical Engineers will hold a technical session Feb. 13, at the William Penn Hotel, at 7.30 p. m. The topic of discussion will be "Electrical and Mechanical Equipment Proposed for the Prevention of Hot Metal Spills in Connection with Hot Metal Mixers, Bessemer Converters, Tilting Open-Hearth Furnaces and Ladle Cranes."

A. H. D'Arcambal Outlines Present Status of Tool Steels

PERTINENT facts regarding certain tools and tool steels, as viewed by an experienced practical observer, were presented before the New York chapter of the American Society for Steel Treating by A. H. D'Arcambal, president of the national society and consulting metallurgist of the Pratt & Whitney Co., Hartford, Conn., on Monday, Feb. 8.

Discussing the melting of tool steel, Mr. D'Arcambal said that 90 per cent of this type of steel is today melted in the arc type of electric furnace. Investigation and use of some steels melted in the more modern high-frequency induction furnace have not as yet revealed their superiority. This may be due to the melting practice and the use of scrap, so that there is the chance that the induction furnace steel may yet be made superior to the other.

Steel now incorporated in taps is either straight carbon or the carbon-vanadium type. There is very little use now for the low tungsten (1.50 per cent Wo) composition.

There has been very little change in the composition of standard high-speed steels in the last 25 years, or since about 1 per cent vanadium was added to regular tungsten high-speed steel, he stated. The use of about 8 to 10 per cent cobalt with about 1.75 per cent vanadium has been developed. Steels of this composition are excellent for rough turning and planing, according to Mr. D'Arcambal. But he did not recommend this type of steel for high-speed taps. The two objections to cobalt are that this alloy lessens the toughness and tends to produce a soft skin.

As to molybdenum high-speed steel, containing 8 to 9 per cent molybdenum in place of tungsten, this has only about 75 per cent the cutting efficiency of high-speed tungsten steel and is hard to forge. In case of war, however, the fact that there is plenty of molybdenum and no tungsten in the United States would be of prime importance, he pointed out.

Discussing the tungsten-carbide type of cutting tools, the speaker said that the regular tungsten-carbide tool was generally acknowledged and demonstrated as not being suited to cutting steel. The main objection to tantalum carbide for cutting steel is its brittleness. The combination of tungsten and tantalum carbides, about 30 per cent of the latter as a binder with cobalt, has thus far proved more successful for cutting steel. While the price of these materials is still very high, Mr. D'Arcambal is confident that the solution of certain problems will bring the price down.

About 90 per cent of the hardening of high-speed tools is now done in electrically heated lead pots, said Mr. D'Arcambal. It has been found that there is too much loss when the salt bath is used. While there are several good gas-fired furnaces, the electric is more susceptible to automatic control as to temperature and atmosphere.

The present heat treatment for hardening high-speed steels, according to the practice developed at the speaker's plant, is as follows: Preheat to 1500 to 1600 deg. F., but do not soak at this heat. Then heat to 2340 to 2350 deg. F. in the high temperature furnace, and quench. Drawing is done at 1050 to 1150 deg. F. with a soaking of about 2 hr.

Mr. D'Arcambal emphasized the fact that in this heat treatment cycle the temperature governs the cutting efficiency regardless of the quenching or drawing methods used.

There was some discussion of the chromium plating of certain small tools. Mr. D'Arcambal spoke very highly of this new development. His testimony is that in the case of chromium-plated reamers, their life on certain aluminum alloy jobs had been increased threefold or from a three-day life to one of three weeks.

National Steel Earned $2.06 a Share in 1931

Fourth quarter net earnings announced by National Steel Corpn. bring to $2.06 a share the total net earnings shown by the company for 1931. Net earnings for the last three months of the year were $668,713, after all charges and Federal tax, equivalent to 31c. a share on 2,156,832 shares outstanding.

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Inland Steel Co., at its recent annual meeting, reduced its dividend to a basis of 25c. per share for the quarter. The net profit for 1931 was $1,263,599.67, equivalent to $1.05 per share on the capital stock outstanding. Net earnings from operations after the deduction of administration expense and charges for repairs and maintenance were $5,418,323.35. The company's allowance for depreciation and depletion was $2,773,491.45.

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Acme Steel Co. reports net profits for the year ended Dec. 31 equal to $1.08 a share on 343,046 shares outstanding. This compares with $2.74 a share in 1930. Cash totaled $2,654,374 against $3,090,613, as of the same date a year ago.

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Scullin Steel Co., St. Louis, reports a net deficit for the year ended Dec. 31, last, after payment of all fixed charges, of $499,289. The deficit included loss from operations of $122,117 and expense of unoccupied plant and underabsorbed plant burden of $106,528. Current assets amount to $903,516 against current liabilities of $298,986.

BUSINESS CHANGES

Reed & Prince Mfg. Co., Worcester, Mass., has been licensed by Dardelet Threadlock Corpn. to manufacture and sell bolts, nuts and screws threaded with the Dardelet self-locking thread.

Concrete Steel Co.'s Washington office at 2539 Pennsylvania Avenue, N. W., has been given the status of a full district office and placed in charge of Dudley S. Bright, transferred from Pittsburgh. Formerly the Washington office was a branch of the Philadelphia office.

Marshall & Huschart Machinery Co., Chicago dealer in machine tools, will station H. D. Gentry at Moline, Ill., to represent the company in Iowa and Fred Bennett, with headquarters at South Bend, Ind., will cover Indiana and Michigan. Both men have been with the company for a number of years in its Chicago office.

Wedron Silica Co., Chicago, has appointed Domhoff & Joyce Co., Cincinnati, its agent in the territory including part of Indiana, Ohio, Wisconsin, Minnesota and Michigan, to handle blast and core sand.

Studebaker Chemical Co., Elyria, Ohio, manufacturer of rustproof coatings under the name of Rust-Oy and other protective coatings, has arranged with the Medusa-Portland Cement Co. to handle the national distribution of its product. The latter company has sales offices in numerous cities. The Studebaker company has started extensions to its plant which will triple its present capacity.

Byers Machine Co., Ravenna, Ohio, shovels and cranes, has added W. T. Walsh Equipment Co., Cleveland, and Boehck Equipment Co., Milwaukee, to its distributer organization.

Baker Brothers, Inc., Toledo, Ohio, manufacturer of machine tool equipment, has appointed Crane-Schiefer-Owens, Inc., Buffalo, N. Y., as its exclusive representative in the Buffalo, Rochester and Syracuse territory.

Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, has moved its Cleveland office, in charge of Hayden F. White, from Union Trust Building to 1740 East Twelfth Street.

Kearney & Trecker Corpn., Milwaukee, manufacturer of milling machines, has appointed Motch & Merryweather Machinery Co., 1315 Clark Building, Pittsburgh, as its exclusive sales representative in the territory including Pittsburgh, western Pennsylvania, West Virginia and eastern Ohio. E. F. Schroeder will continue in Pittsburgh as direct factory sales and service representative.

Globe Steel Tubes Co., Milwaukee, has appointed S. P. Goodloe, Mutual Building, Richmond, Va., as Southeastern sales agent under the jurisdiction of company's New York office.

PIPE LINES

Anderson-Pritchard Oil Corpn., Colcord Building, Oklahoma City, is considering 4 and 6-in. pipe line in local oilfield district. Cost about $50,000.

Dempseytown Gas Co., Dempseytown, Pa., is arranging for purchase of properties of Snydersburg Natural Gas Co., Snydersburg, Pa., and vicinity, including pipe lines, etc., and contemplates extensions in lines.

San Bernardino County Water Works District, San Bernardino, Cal., is arranging for development of Harlem Springs section, District No. 10, approved at recent special election, to include installation of 4-in. steel pipe line, length to be determined; also, hemispherical bottom steel tank, 40,000-gal. capacity on 4-in. column steel tower, elevated 50 to 60 ft. County engineering department is in charge.

Iroquois Gas Co., 45 Church Street, Buffalo, plans installation of pipe line at Elen, N. Y., and vicinity.

Philadelphia awarded general contract for 600 tons of 48-in. steel pipe for North Broad Street project to Alco Products Corpn.

Pasadena, Cal., is in the market for 9000 tons of pipe for a pipe line from Pine Canyon Dam.

Seasonal Gain in Motor Car Output Retarded by Ford's Inactivity

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DETROIT, Feb. 8.

Seasonal upturn in automobile production is being retarded by Ford's delay in revealing its hand.

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Auburn, Graham, Cadillac and Oldsmobile have shown gain in output compared with last year.

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Transmission builders are perhaps the busiest branch of the automotive industry.

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NOW that the automobile shows are over, manufacturers are examining the results in an effort to make a correct appraisal of the situation. There is no denying the fact that almost all the shows have been well attended and interest has been maintained at a high point; on the other hand, the industry is faced by unusually difficult obstacles, such as the continued tendency of people to hoard their money and to refuse to commit themselves to sizable expenditures until they see more encouraging signs ahead.

Then, it is becoming more evident every day that the low-price makers are waiting on Mr. Ford, and, until he chooses to make known his plans, their activities are likely to languish. Although Chevrolet may be deriving a small measure of benefit from the lack of Ford competition, nevertheless an increasing number of buyers are satisfied to wait for an opportunity to examine the new Ford before purchasing a car.

Chevrolet Curtails

The local gear and axle and forge plants and the Flint division of the Chevrolet company have curtailed production from four to three days a week. It is believed that total assemblies this month will be about 40,000 units, against nearly 60,000 in January. Buick, which turned out 6365 units last month, compared with 11,629 in December, has dropped off somewhat, but this is not surprising in view of the fact that it was the first company to put its line on the market. Studebaker is running fairly well, although current operating figures are not available. Installation of equipment for machining the cylinder block for the small Rockne is now being completed at South Bend, and this line should be in production in a week or 10 days. Studebaker is now engaged in coordinating its various divisions. According to the present setup, it has cars in every price field (Rockne, Studebaker and Pierce-Arrow) as well as an active truck manufacturing subsidiary and a parts company for distributing parts for all cars through service depots. Its structure resembles that of the Chrysler Corpn. and means that Studebaker is becoming a factor of increasing importance in the automotive world.

Auburn shipped 2508 cars in January against 2017 in the same month last year. Oldsmobile made 7320 cars from Dec. 15 to Jan. 31, a gain of 2751 cars over the corresponding period of the previous year. Graham-Paige turned out 2537 cars in January, an increase of 23 per cent over last year, and Hupp 1409 cars. Cadillac-LaSalle assembled 2139 units last month against 1637 in January, 1931. Willys-Overland has denied the report that its sweeping price revision is for the purpose of cleaning out stocks preparatory to the introduction of further new models. The trend of the times is indicated by Plymouth's plan to announce shortly a "thrift car" in two models, a two-door coach and a four-door sedan. This car will be priced considerably lower than the present line. Following closely on the reduction of the Willys-Overland six to $415, Plymouth's plan is considered a forerunner of what may be expected from other makers. It is generally accepted in Detroit that the new four-cylinder Ford will establish a low mark for others to shoot at; the local trade is of the opinion that it will be sold at about $375 and the long-heralded eight at less than $600.

Ford Issues Hold-up Order

So far as Ford releases of parts and supplies are concerned, a hold-up order was issued last week, the result being that Murray, Briggs, Kelsey-Hayes and other large sources of Ford materials are virtually at a standstill. Murray has completed its first run of Ford frames and now is idle until Dearborn decides to go ahead. This suspension by parts makers has been felt severely by the steel mills, especially the sheet and strip people. So many changes have been made in the Ford program that suppliers have ceased to count on either direct or indirect business from Ford until it actually is placed. One thing is becoming increasingly apparent: that is, the seasonal upward swing in production, to which the industry has looked forward with confidence, is now imperiled unless Mr. Ford reveals his hand shortly. While Ford's plans do not affect cars in the quality group and the higher brackets of the medium-price class, they have a tremendous influence in the field ranging from $1,000 down; and it is in this field that 95 per cent of the cars are made.

Perhaps the busiest branch of the automotive industry is in the manufacture of transmissions, including free wheeling units. L. G. S. Devices Corun., a Cord-Auburn subsidiary, is working 24 hr. a day making 75,000 spring clutch automatic free wheeling units a month, while the Warner Gear Co. at Muncie, Ind., has stepped up production sharply in the last two weeks. The divisions of the Bendix Corpn. also are operating full-time and are providing considerable work for outside shops.

Japanese Business Placed with European Mills

Bars and Tin Plate Purchased—British Industry Paralyzed by Tariff Uncertainties

LONDON, ENGLAND, Feb. 8 (*By Cable*).—The British iron and steel industry is paralyzed by tariff uncertainties. The Continent is also awaiting a definite decision on the British tariff. Export sales are negligible, but the Far Eastern situation has released some Japanese business, presumably for war purposes, including 1500 tons of Continental bars and 4000 tons of German tin plate.

German home consumers are still buying from hand-to-mouth. Delivery delays are rarely more than two weeks.

The tin plate situation is quiet, awaiting tariff decisions. Prices are firm, a rising tendency being in evidence because of the probable increase in all costs. American tin plate buyers, including some of the California canners, have placed good-sized orders with Welsh mills.

The Continental Wire Rod Cartel will meet at Düsseldorf, Germany, on Feb. 12 to discuss prices and production for the second quarter.

The Gutehoffnungshütte group of Germany has concluded preliminary arrangements with the Nanking Government to establish a plant in China for the production of iron, but there is no intention of starting work immediately owing to the Chinese situation.

The Polish Friedenshütte has partially resumed.

The Bulgarian Bolgarska Terabna Industria has been formed at Sofia with a capital of 10,000,000 leva, mainly to manufacture gas tubes, exclusively for Bulgaria. Therefore it will not join the International Tube Cartel.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9 0s.		
Billets, open-hearth	5 7½	to £5 12½s.	
Black sheets, Japanese specifications	9 7½	to 9 10	
Tin plate, per base box	0 14 3d	to 0 14 9d	
Steel bars, open-hearth	7 17½	to 8 7½	
Beams, open-hearth	7 7½	to 7 17½	
Channels, open-hearth	7 12½	to 8 2½	
Angles, open-hearth	7 7½	to 7 17½	
Black sheets, No. 24 gage	8 0	to 8 10	
Galvanized sheets, No. 24 gage	9 10	to 10	

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at $4.86

Billets, Thomas	£2 7s.	6d.	
Wire rods, No. 5 B.W.G.	5 5		
Black sheets, No. 31 gage, Japanese	11 5		
Steel bars, merchant	2 13		
Beams, Thomas	2 12	6	
Angles, Thomas, 4-in. and larger	2 12		
Angles, small	2 14		
Hoops and strip steel over 6-in. base	3 15		
Wire, plain, No. 8	5 7½		
Wire, barbed, 4-pt., No. 10, B.W.G.	8 15		

Modern Painting for Modern Plants

(*Concluded from page* 395)

ous consideration. In plants with insufficient work to keep a force of maintenance men, including painters, busy continuously, contracts are made with outside firms to do refinishing at regular intervals. In other cases some men from the regular production departments are transferred to do painting during slack periods. In most well-organized plants, however, one man or more is kept busy continuously on refinishing work. Proper supervision of the work they do should certainly include some arrangement whereby the color and quality of paints employed will be such as to benefit all concerned, for the health and well-being of all workers in the plant may be influenced thereby, at least in some degree.

Ash Is Best Value of Blast Furnace Coke

(*Concluded from page* 400)

creased. This may be due to faulty distribution, or to a number of other causes, such as a change in the porosity of the coke. But, in any case, greater combustibility is not indicated because the fuel dissolved by the CO_2 obviously never reaches the tuyeres, or the zone of combustion.

As a result of extensive experiments on several furnaces, G. St. J. Perrott and S. P. Kinney concluded that the large differences observed in blast furnace operation with different cokes are caused by factors other than the relative combustibility of the coke in the tuyere zone.

Summary and Conclusions

1. When coke costs $6.50 delivered at the blast furnace the negative value of each 1 per cent of ash in the coke, burned in an average size blast furnace under average conditions, is approximately 22c. per ton of coke.

2. If the chemical composition of the extraneous ash is the same as that of the inherent ash in the coal, and the percentage of total ash remains constant, the coke consumption of the blast furnace, per ton of iron produced, will be unaffected by varying ratios between the two forms of ash.

3. The negative value of sulphur in blast furnace coke is not evident until the sulphur in the coke exceeds 1 per cent; above 1 per cent the negative value rises rapidly, ranging from 13c. to 28c. a ton of pig iron for each 0.1 per cent rise in sulphur, depending on conditions.

4. Decline in the iron content of Lake Superior iron ores has been counterbalanced by the production of by-product coke of lower ash content.

5. Combustibility of coke, as defined in this paper, has probably been overstressed and is apparently a matter of minor consideration.

Gray Iron Institute Appoints Committees

Appointments of committees of the Gray Iron Institute for the current year have been made by the president, A. E. Hageboeck, Frank Foundries Corpn., Moline, Ill., and the executive committee. Membership committee consists of 20 members, the cost, finance, budget, insurance and trade information committees of five each and the merchandising and technical committees of six each. The committee chairmen are:

Cost—J. L. Carter, Sacks-Barlow Foundries, Inc., Newark, N. J.

Finance and Budget—H. S. Chafee, Builders Iron Foundry, Providence, R. I.

Insurance—William J. Grede, Liberty Foundry, Inc., Wauwatosa, Wis.

Membership—R. J. Redmond, Buckeye Foundry Co., Cincinnati.

Merchandising—C. B. Magrath, North Western Foundry Co., Chicago.

Trade Information—B. G. Parker, Youngstown Foundry & Machine Co., Youngstown.

Technical—H. B. Hanley, American Laundry Machinery Co., Rochester, N. Y.

Formation of two new chapters of the institute has been announced by Arthur J. Tuscany, the manager. One is the Quad City chapter, which will cooperate with the Quad City Foundrymen's Association. Charles F. Scherrer, Davenport Foundry & Machine Co., Davenport, Iowa, is chairman of this chapter. The second new chapter was formed in Milwaukee with A. C. Ziebell, Universal Foundry Co., Oshkosh, Wis., chairman; C. P. Wolfe, Wisconsin Gray Iron Foundry Co., Milwaukee, technical chairman; George Kneisler, Vilter Mfg. Co., Milwaukee, cost chairman, and E. L. Wieland, Milwaukee Gray Iron Co., merchandising chairman.

Output of babbitt metal in 1931 totaled 26,423,967 lb., against 42,752,921 lb. in 1930. December production declined to 1,650,449 lb., from 1,861,787 lb.

...PERSONALS...

C. E. WILSON, for the past nine years general sales manager of the Worthington Pump & Machinery Corpn., Harrison, N. J., has been appointed vice-president in charge of industrial relations. He began his career with Worthington in 1899 as a salesman in the Chicago office and through successive promotions held positions of sales manager of that office, assistant general sales manager in charge of the territory from Cleveland to Denver, and from 1918 to 1923 assistant general sales manager in charge of foreign business. CLARENCE E. SEARLE, who, as announced in these columns on Jan. 14, resigned as general representative of the Allis-Chalmers Mfg. Co., Milwaukee, effective Jan. 31, has been made vice-president in charge of sales of the Worthington company.

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DONALD L. MCCUBBIN, heretofore assistant manager of the Cincinnati plant of Joseph T. Ryerson & Son, Inc., Chicago, has been promoted to the managership, succeeding LEWIS E. SKINNER, who returns to the Chicago organization to take over a special sales department. Mr. McCubbin has been identified with the Ryerson company for more than 15 years.

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FRED T. CONNOR, for the past eight years Chicago district sales manager of the Pittsburgh Crucible Steel Co., has been made manager of the Western railway division, with headquarters in Chicago, of the Crucible Steel Co. of America, succeeding FRED BASKERFIELD, who has retired after having held that post for many years.

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WALTER J. MOLTRUP has been elected president of the Moltrup Steel Products Co., Beaver Falls, Pa., succeeding his brother, the late J. Thomas Moltrup. The new president has been a director of the company for a number of years. F. F. WARD, who has been vice-president in charge of sales, becomes vice-president, and M. L. MCGAUGHEY has been made assistant treasurer. J. FRANK MOLTRUP continues as vice-president in charge of operations and J. L. PHILLIPS as secretary and treasurer.

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K. V. WHEELER, general manager of the Lebanon Steel Foundry, Lebanon, Pa., and H. J. ROWE, of the technical control and development section of the Aluminum Co. of America, Cleveland, will discuss "Foundry Factors Affecting Casting Design" at a joint meeting of the Pittsburgh Foundrymen's Association and the American Foundrymen's Association, Inc., to be held at the Fort Pitt Hotel, Pittsburgh, on Monday evening, Feb. 15.

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J. R. RUE, managing engineer of the motor department of the General Electric Co., Pittsfield, Mass., plant, has been assigned to special work at Schenectady. He had been at Pittsfield since 1912. K. R. VAN TASSEL, designing engineer of the same department, has been transferred to the Fort Wayne works.

S. R. WILLOCK has resigned as vice-president and director of the Wellman Engineering Co., Cleveland. His plans for the future have not been announced.

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WILLIAM A. DALEY and T. E. BORTON have been elected directors of Van Dorn Iron Works Co., Cleveland, to fill vacancies caused by the death of Clifford E. Pierce and the resignation of J. A. BOYDEN. The latter continues as secretary.

C. E. WILSON

C. E. SEARLE

D. L. McCUBBIN

COL. FRANK CHAPPELL has been appointed factory manager in charge of chassis assembly and all activities of the north plant of General Motors of Canada at Oshawa, Ont. N. C. MILLMAN, who has been head of the inspection staff, is to be factory manager in charge of Fisher Body operations. A. D. WADERLOW, formerly superintendent of the stamping plant, is to be factory manager of the sheet metal division, while GORDON PENNINGTON, heretofore assistant superintendent of the motor plant at Walkerville, has been promoted to factory manager there.

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H. C. O'BRIEN has been appointed assistant manager of sales of the Pittsburgh district sales office of the American Sheet & Tin Plate Co., effective Feb. 1.

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J. F. MEHLHOPE, formerly Chicago district sales manager for Central Alloy Steel Corpn., and later for Newton Steel Co., has joined the sales force of the Chicago Steel Service Co., warehouse distributer for Toncan iron and Enduro rustless steels, of the Republic Steel Corpn. The Chicago company has recently enlarged its offices and warehouse facilities and is expanding its sales force.

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HARRY A. KIDDER, superintendent of motive power, Interborough Rapid Transit Co., New York, has been elected president for 1932 of the United Engineering Trustees, New York, joint agency of the four founder engineering societies. HAROLD V. COES, consulting management engineer, Ford, Bacon & Davis, and COL. ARTHUR S. DWIGHT, president, Dwight & Lloyd Companies, were named vice-presidents. DR. ALFRED D. FLINN, director of the Engineering Foundation, continues as secretary.

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H. G. SHARP has resigned as vice-president and general manager of the Transue & Williams Steel Forging Corpn., Alliance, Ohio.

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A. J. SANFORD, formerly connected with the Timken Roller Bearing Co., Canton, Ohio, has been elected vice-president of the Cleveland Hardware Co., Cleveland. Previously he was affiliated with the Marion Steel Shovel Co. and Huber Mfg. Co., Marion, Ohio.

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W. J. MACNEILL, superintendent, Federal Malleable Co., West Allis,

R. C. Ross

ROBERT C. ROSS, formerly assistant to the president and in charge of plant operations of Joseph T. Ryerson & Son, Inc., has been elected vice-president, as announced in these columns last week.

HAROLD B. RESSLER, who as announced in The Iron Age of Feb. 4 has been elected vice-president.

H. B. Ressler

Wis., is to speak on "Scientific Price Setting in the Foundry" at a meeting of the Quad-City Foundrymen's Association, to be held at LeClaire Hotel, Moline, Ill., on Feb. 15.

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PAUL CROUSE, assistant manager of the Ames, Baldwin, Wyoming Shovel Co. plant at Anderson, Ind., has left for Northeaston, Mass., where he will be connected with a unit of the company there.

GEORGE P. TORRENCE, vice-president of the Link-Belt Co. and general manager of the two Indianapolis plants since 1925, has left for Chicago to become acting president of the company. JAMES S. WATSON, who, under Mr. Torrence, has been in charge of the Dodge plant of the company, will become vice-president and general manager of the two Indianapolis plants, with F. S. O'NEIL assistant general manager.

Steel Treaters to Meet in Buffalo, October 3

Buffalo was selected for the fourteenth annual National Metal Congress and exposition at a meeting of the board of directors of the American Society for Steel Treating in Cleveland on Feb. 5. The convention will be held the week of Oct. 3, 1932. The exposition and afternoon technical sessions of the congress will be held at the 174th Regimental Armory, a building which offers 105,000 sq. ft. of exhibit space, free from pillars. Ample meeting rooms for all societies in the congress are available within the armory building.

Foundry Companies at Rockford, Ill., Merge

The Rockford Northwestern Malleable Corpn. and the Gunite Corpn., both of Rockford, Ill., have consolidated under the name of the Gunite Foundries Corpn., it is announced here by Duncan P. Forbes, president and general manager of the new concern.

Mr. Forbes formerly served as president of both of the merged corporations. Others in active management of the new company are J. A. Forbes, secretary and assistant to the president; Frank C. Rutz and Erwin J. Mohr, vice-presidents; Noble J. Schmidt, treasurer, and L. R. McCullough, advertising manager. The latter also will serve as sales manager of the Guncor brake drum replacement division.

The new corporation will manufacture brake drums, clutch pressure plates, connecting rods, wrenches, bolts and anti-freeze solutions.

Foundry Accidents Cause Much Lost Time

Foundry accidents in Ohio during 1931 cost 599 years of lost time, according to Robert Hoierman, Cleveland, secretary, Ohio Foundries Association, which is conducting a Statewide campaign to reduce the frequency and severity of accidents. This is shown by reports filed during the year by the Ohio Industrial Commission. Reports from 133 plants employing 10,671 workmen, 1,250,000 man hours, during November showed 51 minor accidents. December reports from 82 foundries employing 6382 persons, 930,163 man hours, showed 32 minor accidents.

The State report indicates an average of 16 accidents a day in Ohio foundries, eight of which are in gray iron plants, two in steel foundries, three in non-ferrous foundries, two in malleable plants and one in cast iron pipe foundries. Lost time during 1931 showed 232 years for the gray iron, 155 for non-ferrous, 106 for steel, 85 for malleable and 22 years for cast iron pipe plants.

Discussing foundry accidents at a meeting of the foundrymen of northwestern Ohio held in Toledo recently Dr. W. E. Obetz, medical director of the Ohio Industrial Commission, said that by eliminating infection through prompt first aid treatment Ohio foundrymen can save $150,000 a year. Infections, he asserted, count for 28 per cent of the lost time in foundry accidents in the State and he urged the importance of proper first aid in case of slight cuts and lacerations, which he said comprise 38 per cent of all foundry accidents. Crushes and bruises cause 18.6 per cent. The meeting was held at the plant of the Industrial Steel Casting Co. and was attended by 60 foundrymen.

New Lead Pipe Standard Is Approved

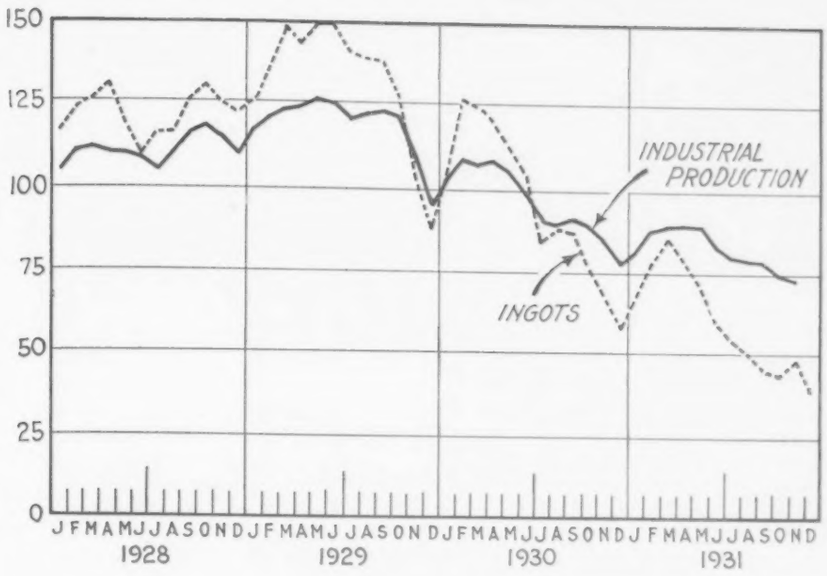
The Lead Industries Association, 420 Lexington Avenue, New York, has approved a new standard of lead pipe sizes which is being adopted by principal manufacturers. The outstanding feature of the new standard is that all sizes of lead pipe in the A, AA and AAA classifications will safely withstand constant cold water pressures of 50, 75 and 100 lb. per sq. in. respectively. The principal changes occur in diameters of 1 in. to 2 in. Alterations in sizes below 1 in. have also been effected to introduce a uniformity which has not existed among lead pipe sizes of various manufacturers.

Made Steel Trusses Look Like Wood

Steel plates were applied to some steel roof trusses in the building of the Church House of the Second Presbyterian Church, at Auburn, N. Y., to give the trusses the appearance of wood construction. Apparently it was believed that exposed structural steel in the upper reaches of the auditorium would have a cold look, and to the steel members, the main elements of which were 8-in. wide flange beams, were attached ⅛-in. plates. One bottom plate covered the under side of the trusses and there were two side plates. At the junctions the plates were shop welded along the entire length.

The fabrication and erection were made by the Auburn Iron Co., E. H. Herrling, president, and P. W. Hann, engineer. The apparent square cross-sections simulated wood, and it is stated that the construction was cheaper than if the steel work had been enclosed in lumber.

The Prince Is Now a Pauper ▲ ▲ ▲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INDUSTRIAL PRODUCTION
INGOTS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1928
1929
1930
1931

STEEL is either prince or pauper. The degree to which steel production exceeds general business activity in good times and falls short of it in bad times is shown in the chart. The solid line represents general industrial production, as reflected by the Federal Reserve Board index (unadjusted). The steel index covers average output per day by months. In the case of both indexes the 1923-1925 average equals 100.

* * *

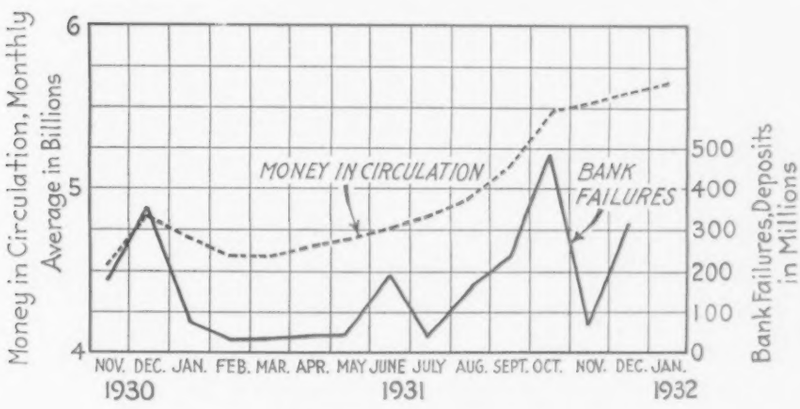
Bank Failures Beget Hoarding

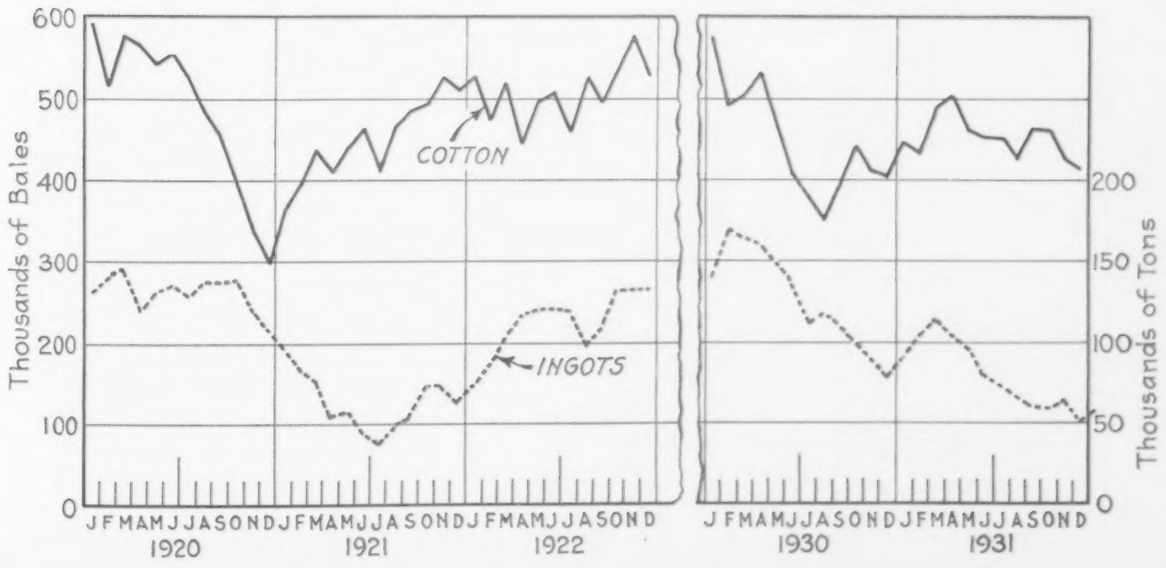
BANK suspensions have greatly increased the amount of money in circulation. It is clear that hoarding will stop only when faith in the solvency of our banking institutions is restored. Confidence will be reestablished when bank failures are definitely arrested. The Reconstruction Finance Corporation is counted on to do much to achieve that end.

* * *

Are Textiles in the Van?

IN the 1920-1921 depression, textile production declined and recovered sooner than steel output. In the current depression the lowest point reached in American mill consumption of cotton was in August, 1930. The recovery that ensued was marked until the world financial panic of last summer, following which the line became irregular.





• • EDITORIAL

"Put Hoarded Dollars to Work"

ECONOMIC recovery requires that money be brought out of hiding and put into circulation. So important is the matter that President Hoover has rallied about him some 40 national associations with a membership of 20,000,000 pledged to an organized movement looking to the return of from $1,250,000,000 to $1,500,000,000 to the channels of commerce. The Reconstruction Finance Corporation cannot be expected to do the whole job of buttressing our banks and mobilizing credit. It can, and does, provide the necessary reinforcing of confidence which is the antidote to the fear psychosis that causes hoarding. Dollars will come out of hiding when their owners cease to be afraid of losing them.

In this connection it is well to remember that all of the hoarded money is not in socks, under mattresses or in safe deposit boxes. Some of our leading bankers appear to be notorious in the matter of hoarding too. Two of our largest financial institutions recently declared themselves to be "over 70 per cent liquid," which of course means that only 30 per cent or less of the money entrusted to them is at work.

From the standpoint of credit rehabilitation it is hard to distinguish between a dollar buried in the back yard and a dollar buried in a bank vault.

Pittsburgh, Washington, London

ANDREW W. MELLON will undoubtedly go down into history as one of the greatest Secretaries of the Treasury. The fiscal problems he has so ably solved during his decade of service have revealed his high qualifications. Unexpectedly called by President Harding to take over the heavy burdens of international debts, and great domestic questions, Mr. Mellon faced tasks that in some respects were unprecedented. Only a man of exceptional breadth of understanding could have worked out the policies which have developed remarkable results of vital importance to the well being of the nation. His resignation, therefore, is a source of regret. It is assuring, however, that one so well equipped for the position has been selected as ambassador to England.

It is assuring also that Ogden L. Mills has been chosen to succeed Mr. Mellon. As Undersecretary of the Treasury, Mr. Mills has become thoroughly familiar with our fiscal affairs. He is faced with problems of great importance and in handling them no doubt will justify the confidence President Hoover has shown in him in giving him the cabinet portfolio.

Wage Inequalities

ACCORDING to the Declaration of Independence, all men are created free and equal. Exception may be taken to this statement and certainly none will deny that the initial state of equality at creation does not long accompany life after its initiation.

This is particularly apparent in these days of wage adjustment, especially to those in the metal producing and consuming industries. Here we are faced with wage and salary reductions amounting, in many cases, to 40 per cent of the amounts earned in 1929. Stockholders in the majority of metal-working enterprises have fared even worse, being deprived in many cases of any return on investment.

The producers of our basic industrial materials, whose welfare is essential to a long chain of subsequent fabricators of finished products, are particularly noticeable by their absence from the scanty roster of profit earners of the present day. Equipment manufacturers, or at least the majority of them, are in the same rather leaky boat.

Contrasted with what has happened to wages and salaries in these primary and essential industries, one cannot help but notice the reluctance with which railroad labor accepted its 10 per cent "temporary" cut.

Readjustments are now in order in the building trades, but are being rigorously opposed. No reductions, so far as we know, have as yet been suggested for street railroad employees, and an increased number of public employees are still drawing wartime salaries.

Wage adjustments were not welcomed by management or labor, and were postponed, with noticeable restraint, until they became inevitable. Now that they are in order, they should be, so far as possible, made equitably between industries and trades. Depressions should have no class consciousness.

Testing the Anti-Trust Laws

THE impending legal test of the regional sales agency plan instituted in the bituminous coal industry will be watched with genuine interest. In many respects the system is similar to that which is being urged in other industries as a means of economical distribution, a subject that has been pressed urgently by reason of the depression. The regional sales agency provides for cooperative marketing among coal producers in given territories through agencies to which stock is subscribed to cover cost of operation.

The Appalachian Coals, Inc., has determined to go to the courts, even to the Supreme Court of the United States, its sponsors say, to determine its rights. Its plan

COMMENT • •

was created by Col. William J. Donovan. Mr. Donovan insists it is legal. Mr. Donovan was "trust buster" under the Coolidge administration. His successor, John Lord O'Brian, speaking as Assistant Attorney General of the United States, has expressed the formal view that it is illegal. So much for the uncertainty of the anti-trust laws. Whatever the need as to their repeal or modification, it is painfully evident they need clarification when a former assistant attorney general says a plan does not violate the law while his successor thinks it does!

Standardize, But Not Ideas

CHARLES F. KETTERING says business will shake itself free from stagnation and walk lively again when it offers for sale new services, new interests, new products—and begins to make up with development for the wasteful eight years given to exploitation.

He blames exploitation of the future for the depression. We were trying to make civilization a life of drab existence instead of recognizing it as a thing of growing spirit and adventure. "Life," he said, "is a growth, not a static thing; yet all the tendencies of civilization are to standardize. I do not object to standardizing the materials, for instance, that go into gears. I do object to standardization of ideas and I object to cutting the pattern of the future from the knowledge of today. We tried to do that before the crash. We tried to tell people what they were going to do and how they were going to do it for 25 years to come.

"The trouble is that most economists do not see that civilization follows biological laws. Therefore, the only thing to do is to adjust our changeable economic laws. Economic thought does not follow progress; progress must dictate economic thought."

Sheets Without Manual Labor

ROLLING sheets by the time-honored method has given a much better account of itself than was believed likely when the continuous process became established. Inventive genius is in part responsible, and a helpful factor has been the steadily increasing consumption of sheets. For example, against a shrinkage from 1930 of 37 per cent in the tonnage of all forms of steel rolled in 1931, production of sheets receded in 1931 not quite 24 per cent.

Mechanical manipulation of the steel at the point of rolling has been one of the engineering achievements. The manual work of the roller and catcher, who have been the age-long skilled hard workers of the conventional rolling process, is replaced by mechanisms which have eliminated the back-straining effort and speeded up operations. Coupled with continuous heating furnaces for both the sheet bars and the packs, and including of course mechanical doublers, sheet rolling with the single stand of roughing and single stand of finishing rolls has become almost totally mechanical.

And now in the offing is a method designed to give heavy drafts in preparing the sheet bar, so that a further considerable cost reduction seems likely. This would favor the competitive position of the self-contained sheet rolling unit, and would be calculated to extend to the economical manufacture of sheets of rustless steels and sheets of compositions that are relatively refractory from the rolling standpoint. Old-time sheet mills bid fair to obtain a longer lease of useful life, thanks to the modernization movement and the general economic situation that is accelerating it.

Seasonal Gains Delayed

BUYING habits, rather than swings in actual ultimate consumption, have been held by competent observers to be largely responsible for the marked variations in steel production that have generally occurred in the course of a year. This course has almost invariably involved increases to a peak in March, or possibly April, followed by decreases to a low July, while usually there has been an autumn increase to a high October or November.

The conception that the spring bulge has represented preparation for summer and the autumn bulge preparation for winter is not inconsistent with the theory of "buying habits," for preparation connotes anticipation. In times like these, however, one does not anticipate—he waits until the last moment and then telegraphs or telephones his order.

In this connection it must be recognized, of course, that the steel mill customer is not usually the ultimate consumer. Steel may pass through one, two or more successive stages of manufacture, in successive plants, or pass through channels of distribution. In rails the buyer is the ultimate consumer, but purchases are usually made long in advance and winter deliveries are distributed along track for spring laying.

It is quite rational, in existing circumstances, that steel producers should be expecting a substantial increase in steel demand to begin about March 1 rather than in January as usual. This is not an alibi contrived after the turn of the year failed to show much change, for the expectation was expressed in December. The result would be to throw the "spring peak" later than usual, and second quarter production would well exceed first quarter, when for several years prior to 1929 there were decreases averaging about 5 per cent.

JAMES A. CAMPBELL

James A. Campbell Retires; H. G. Dalton Succeeds Him

Chairmanship of Youngstown Sheet & Tube Co. Passes to Cleveland Man—Mr. Campbell in Poor Health

HENRY G. DALTON

JAMES A. CAMPBELL has resigned the chairmanship of the Youngstown Sheet & Tube Co., Youngstown, and has been succeeded by Henry G. Dalton, partner of Pickands, Mather & Co., Cleveland.

Mr. Campbell tendered his resignation both as chairman and as director at a meeting of the board of directors of the Youngstown Sheet & Tube Co., Feb. 5. He was elected to the newly-created position of chairman emeritus.

Mr. Campbell explained to the board of directors that his health had been unsatisfactory for some time and he felt it advisable that he yield to the requests of his physicians and family that a younger man should assume the burden of responsibility in the company and that his capacity should become that of friendly adviser. He has been actively connected with the Sheet & Tube company in an executive capacity since its incorporation in 1900. After the retirement of George D. Wick, Mr. Campbell was made president of the company in 1906 and he retained that position until 1930, when he became chairman of the board.

He will leave shortly for Florida, where he will remain for some months in an effort to recover his health. He is 78 years of age.

Organization to Be Unchanged

Mr. Dalton, who has been first vice-president of the Sheet & Tube company and a member of its executive committee for several years, is said to have accepted the chairmanship somewhat unwillingly, but finally yielded to the importunities of the other directors to head the company. Mr. Dalton gave out the following statement at his offices in Cleveland:

"Mr. Campbell has been in ill health for some time and in a letter presented to the directors urged that he be relieved of his duties, so that his mind and time would be entirely free to devote to regaining his health. The board, under the circumstances, felt they must accept his resignation, but elected him chairman emeritus to perpetuate his connection with the company which he has so successfully built and developed.

"It is my sincere hope that we may be able to carry on the strong and far-seeing policies on which Mr. Campbell has built the company without encroaching too much upon his desire and need for relief, although he has assured us we may bother him, as much as his physicians permit, for his friendly advice.

"No other changes in the organization and, of course, no changes in policy are involved."

No Merger Developments

Mr. Dalton was asked if his election to the chairmanship involved any developments in connection with a possible merger of the company and his reply was "absolutely not." Mr. Dalton was one of the prime movers in the effort to merge the Youngstown Sheet & Tube Co. with the Bethlehem Steel Corpn., which was defeated after long litigation by Cyrus S. Eaton and other large stockholders in the Sheet & Tube company. Mr. Dalton was a director of the Bethlehem Steel Corpn. for several years, but resigned recently. He is chairman of the Interlake Iron Corpn., president of the Interlake Steamship Co., and, through his partnership in Pickands, Mather & Co., has been prominent in the iron ore trade for many years.

Scrap Dealers to Consider an Export Association

The development of foreign markets for scrap iron and steel will be a topic of discussion at the annual convention of the Institute of Scrap Iron and Steel, to be held in Washington, March 8, 9 and 10. The export situation will be considered at a special session, which will be addressed by Luther Becker, chief of the Iron and Steel Division, Department of Commerce, and a representative of the Federal Trade Commission, in charge of export associations. It is expected that a proposal will be considered to organize an export corporation or association under the Webb-Pomerene Law.

Orders were placed in 1931 for 8017 steel boilers of 7,229,618 sq. ft., against 13,166 of 13,469,893 sq. ft., in 1930, according to reports received by the Bureau of the Census from 73 identical manufacturers.

Shipments of mining and industrial electric locomotives in 1931 totaled 227 units, against 496 in 1930, according to reports received by the Bureau of the Census from nine producers, who comprise practically the entire industry.

Illinois Opposes I. C. C. on Chicago Switching Rates

The Illinois Commerce Commission is taking steps opposing any action by the Interstate Commerce Commission toward increasing intrastate freight rates within the Chicago switching district.

The Illinois commission last August entered an order in which jurisdiction was taken over rates on intrastate traffic in the Chicago switching district. It found that railroads operating in the district had not justified by evidence presented any increase in switching rates. The carriers later sought to counteract the order by filing a petition with the Interstate Commerce Commission, asking it to exercise jurisdiction over rates on intrastate traffic in the district.

To combat the effort of the carriers, the Illinois commission has filed with the Interstate Commerce Commission a motion telling the Interstate Commerce Commission that it should not exercise its authority under Section 13 and thus override and nullify the decision of the Illinois commission.

The International Foundry Exposition is scheduled to open at Paris on Sept. 1. Information may be obtained from the Syndicat Générale des Fondeurs de France, Paris, France.

Steel Business Loses Ground as Automobile Industry Curtails

January Gain Checked by Adverse Influences in Many Consuming Lines—Valley Pig Iron Declines—Effort to Boost Sheet Prices

THE minor improvement in steel business in January, which resulted in a gain in ingot output for that month of 12.2 per cent over December, is not being maintained, there having been a sharp decline in volume of orders for some products, notably those going to the automobile industry. Ingot production is not visibly affected, the current rate being 28 per cent of capacity, the same as last week. Expectations of an increase this month rely largely on prospective railroad purchases, particularly rails.

A very definite factor in business curtailment is the slowing down of schedules by the motor car manufacturers, caused by lagging sales and the desire to move slowly until Ford's plans are fully revealed. Curtailment is especially in evidence among units of General Motors, whose January sales both to dealers and car users were below those of December, going against the usual trend. It is now doubtful whether February output of cars will equal that of January.

The entire picture of the steel industry is one of inability to make progress against conditions which restrict the purchase of materials on almost every hand. In building there is virtually no private work, while lettings of fabricated structural steel and reinforcing bars for public projects are unfavorably affected by State and municipal budget reductions. Bookings of fabricated structural steel this week are only 5250 tons, the smallest for any week since THE IRON AGE has been compiling this record, and new projects call for only 7000 tons. A sharp drop has occurred in steel releases by the farm implement industry, which probably will curtail manufacturing schedules.

ALTHOUGH the railroads seem to offer the best immediate prospect for increased steel buying, they are moving slowly. The only rail order of size is 20,000 tons for the Southern Pacific, but distribution of 17,000 tons by the Nickel Plate may come soon. Meanwhile, the Colorado rail mill has been able to resume production, but a Chicago mill, scheduled to start this week, has been obliged to postpone operations until next week. Resumption of work in some railroad shops has had no noteworthy effect on steel orders.

Tin plate, which is counted upon at this time of year to aid mill schedules, is not gaining in volume of orders or operations, owing to the uncertainty of some of the large can makers as to this year's prospects, and the tin plate market is disturbed by competition from Welsh mills, which have sold several lots in this country at about $3 per base box, or $1.75 under the domestic official price. Foreign competition is also becoming more severe in other steel products and in pig iron.

The Far Eastern situation has had no important influence on steel markets, though some Japanese orders have been placed in Europe, and a few small orders for munitions steel of undisclosed origin have been distributed in this country.

AN important step toward rallying a weak price situation is being taken by manufacturers of sheets and strips. Efforts to advance some prices and prevent further declines in others are likely to extend beyond the flat-rolled branch of the industry. Announcements by a few mills name prices on sheets from $2 to $4 a ton above those recently in effect. Although a time of subnormal demands is not considered favorable for an advance in prices, the sheet trade accomplished such a move last July under similar conditions, and prices remained fairly stable during the third quarter and part of the fourth. Declines in many grades, amounting to $5 a ton or more, have occurred mostly since Dec. 1.

No further downward revisions of importance on steel products have occurred during the week, but pig iron has declined 50c. a ton in the Valleys and at Pittsburgh, and steel scrap is lower in the Chicago district and in eastern Pennsylvania. THE IRON AGE composite prices for these products have declined to $14.48 for pig iron, the lowest since September, 1915, and $8.23 for steel scrap, a new all-time low record. Finished steel is unchanged at 2.037c. a lb.

ALTHOUGH ingot output gained 12.2 per cent in January, comparing favorably with an average gain of 13 per cent for that month in the 10 preceding years, the December base was so low that the rise loses significance. December output was only 41 per cent of the average for that month during the preceding decade, and the slightly higher January total was also only 41 per cent of the average for that month in the preceding 10 years. Bessemer steel lost ground in January, making the gain for open-hearth 15 per cent.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, one Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Feb. 9, 1932	Feb. 2, 1932	Jan. 12, 1932	Feb. 10, 1931
No. 2 fdy., Philadelphia	$15.64	$15.64	$15.64	$17.76
No. 2, Valley furnace	*15.00*	15.50	15.50	17.00
No. 2 Southern, Cincinnati	13.82	13.82	14.82	14.19
No. 2, Birmingham	11.00	11.00	12.00	13.00
No. 2 foundry, Chicago*	16.50	16.50	16.50	17.50
Basic, del'd eastern Pa.	16.25	16.25	16.25	17.25
Basic, Valley furnace	*14.50*	15.00	15.00	17.00
Valley Bessemer, del'd P'gh	*17.39*	17.89	17.89	19.26
Malleable, Chicago*	16.50	16.50	16.50	17.50
Malleable, Valley	*15.50*	16.00	16.00	17.50
L. S. charcoal, Chicago	23.17	23.17	23.17	27.04
Ferromanganese, seab'd carlots	†75.00	†75.00	†75.00	80.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Ferromanganese quotations adjusted to carload unit; larger quantities at discount.

Rails, Billets, etc.,

Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	34.00	34.00	34.00	36.00
Rerolling billets, Pittsburgh	27.00	27.00	28.00	30.00
Sheet bars, Pittsburgh	26.00	26.00	28.00	30.00
Slabs, Pittsburgh	27.00	27.00	28.00	30.00
Forging billets, Pittsburgh	*33.00*	34.00	34.00	36.00
Wire rods, Pittsburgh	37.00	37.00	37.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.50	1.50	1.50	1.60

Finished Steel

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.50	1.50	1.50	1.65
Bars, Chicago	1.70	1.70	1.70	1.70
Bars, Cleveland	1.55	1.55	1.55	1.70
Bars, New York	1.85	1.85	1.85	1.98
Tank plates, Pittsburgh	1.50	1.50	1.50	1.65
Tank plates, Chicago	1.70	1.70	1.70	1.70
Tank plates, New York	1.798	1.798	1.798	1.93
Structural shapes, Pittsburgh	1.50	1.50	1.50	1.65
Structural shapes, Chicago	1.70	1.70	1.70	1.70
Structural shapes, New York	1.76775	1.76775	1.76775	1.90½
Cold-finished bars, Pittsburgh	2.00	2.00	2.00	2.10
Hot-rolled strips, Pittsburgh	1.40	1.40	1.40	1.55
Cold-rolled strips, Pittsburgh	1.90	1.90	1.95	2.25

Finished Steel

Per Lb. to Large Buyers:	Feb. 9, 1932 Cents	Feb. 2, 1932 Cents	Jan. 12, 1932 Cents	Feb. 10, 1931 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.15	2.15	2.25	2.35
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.30	2.30	2.40	2.45
Sheets, galv., No. 24, P'gh	2.75	2.75	2.80	2.90
Sheets, galv., No. 24, Chicago dist. mill	*2.85*	2.90	2.90	3.00
Hot-rolled sheets, No. 10, P'gh	1.60	1.60	1.60	...
Hot-rolled sheets, No. 10, Chicago dist. mill	1.70	1.70	1.75	...
Wire nails, Pittsburgh	1.95	1.95	1.95	1.90
Wire nails, Chicago dist. mill	2.00	2.00	2.00	1.95
Plain wire, Pittsburgh	2.20	2.20	2.20	2.20
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.25
Barbed wire, galv., Pittsburgh	2.60	2.60	2.60	2.55
Barbed wire, galv., Chicago dist. mill	2.65	2.65	2.65	2.60
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.00

Old Material

Per Gross Ton:				
Heavy melting steel, P'gh	$10.25	$10.25	$10.25	$12.75
Heavy melting steel, Phila.	*7.37½*	7.50	7.50	10.50
Heavy melting steel, Ch'go	*7.12½*	7.25	7.75	10.12½
Carwheels, Chicago	7.50	7.50	8.50	10.50
Carwheels, Philadelphia	10.50	10.50	11.50	13.50
No. 1 cast, Pittsburgh	10.00	10.00	10.00	12.50
No. 1 cast, Philadelphia	10.00	10.00	10.00	12.00
No. 1 cast, Ch'go (net ton)	7.50	7.50	7.50	9.50
No. 1 RR. wrot., Phila.	8.50	8.50	9.50	12.00
No. 1 RR. wrot., Ch'go (net)	6.50	6.50	6.50	8.00

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt	$2.25	$2.25	$2.25	$2.50
Foundry coke, prompt	3.50	3.50	3.50	3.50

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*6.62½*	6.87½	7.62½	9.87½
Electrolytic copper, refinery	*6.25*	6.50	7.25	9.50
Tin (Straits), New York	*21.75*	22.25	22.00	26.00
Zinc, East St. Louis	2.85	2.85	3.05	4.05
Zinc, New York	3.22	3.22	3.42	4.40
Lead, St. Louis	3.55	3.55	3.55	4.30
Lead, New York	3.75	3.75	3.75	4.50
Antimony (Asiatic), N. Y.	*6.75*	7.25	6.00	7.05

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Feb. 9, 1932	2.037c. a Lb.	$14.48 a Gross Ton	$8.23 a Gross Ton
One week ago	2.037c.	14.65	8.33
One month ago	2.052c.	14.65	8.50
One year ago	2.142c.	15.88	11.13
	Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1931	2.142c., Jan. 13	2.052c., Dec. 29	$15.90, Jan. 6	$14.79, Dec. 15	$11.33, Jan. 6	$8.50, Dec. 29
1930	2.362c., Jan. 7	2.121c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.412c., April 2	2.362c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.391c., Dec. 11	2.314c., Jan. 3	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.453c., Jan. 4	2.293c., Oct. 25	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22
1926	2.453c., Jan. 5	2.403c., May 18	21.54, Jan. 5	19.46, July 13	17.25, Jan. 5	14.00, June 1
1925	2.560c., Jan. 6	2.396c., Aug. 18	22.50, Jan. 13	18.96, July 7	20.83, Jan. 13	15.08, May 5

Pittsburgh Steel Demand Not Broadening; Pig Iron Lower; Sheets to Be Advanced

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PITTSBURGH, Feb. 9.— Local steel producers report no improvement in current releases, and some of them find aggregate tonnage running well under January levels. Buying by the automobile industry is declining, and no indication of broadening demand is indicated in any of the large consuming industries.

The most favorable development of the week is a prospective price advance in flat-rolled steel products, which may be extended to other lines in an effort to stabilize the market. Announcements of higher quotations on sheets are being made by some mills, and producers hope to regain most of the decrease in selling prices which has taken place in the last three months.

Consumers of steel still show no disposition to place forward contracts, and current sales are mostly of a hand-to-mouth character for immediate delivery. In the absence of important transactions, market prices are difficult to determine. No specific change has occurred in the last week. Makers of bars, plates and shapes, however, are more inclined to regard the market at a flat 1.50c., Pittsburgh, and higher figures are gradually disappearing.

Steel ingot production in the district is unchanged at about 22 per cent of capacity, but may be advanced in the next week if the local rail mill gets into production. Several open-hearth plants are making no steel, and the larger interests continue to concentrate production at a few points. Finishing mill schedules are not changed in the aggregate, although slightly lower production is reported for tin plate, strip steel and some finishes of sheets. Bar mill schedules are holding their own, and structural shape units are supported by the backlog tonnage of large fabricators.

Pig iron prices have declined at Pittsburgh and in the Valleys, following sales of several grades in which Cleveland competition was an important factor.

Scrap prices are generally unchanged, although hydraulic compressed sheets have been sold at 25c. a ton over previous prices.

Buying by automobile industry declining; no broadening of demand in other large consuming channels.

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Pig iron prices at Pittsburgh and in Valleys have declined 50c. a ton.

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Makers of sheets and strip to try to stabilize market. Some prices to be advanced.

* * *

Steel ingot production of district unchanged at 22 per cent of capacity.

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Pig Iron

A Valley consumer of foundry iron has placed its February-March requirements with a Cleveland and a Valley producer. The price figured back to approximately $15, Valley furnace, and less than $14, Cleveland. A sale of basic iron was also made in this district, and, although the price and seller were not made known, Valley producers who quoted $14.50, furnace, lost the business. A small sale of Bessemer iron at $15.50, Valley furnace, is also reported, and the other grades of iron in both Valleys and Pittsburgh are correspondingly lower. Otherwise, transactions have been confined to the usual small-lot purchases for immediate consumption, and recent sales are not interpreted as a beginning of a buying movement. Shipments this month are averaging about the same as in January.

Semi-Finished Steel

Shipments have failed to show any improvement this month and are falling under those of January with some companies. Prices are still weak and are quotable only at the recent nominal levels of $26, Pittsburgh, for sheet bars and $27 for slabs and billets. Forging billets range from $33 to $34, Pittsburgh. The price of $37 on wire rods is receiving little test, but no concessions are reported.

Rails and Track Supplies

In spite of the fact that prospects for the placing of business by the railroads are considerably brighter, no inquiry has appeared here in the last week and releases have shown little increase. Although the carriers will save large sums by the recent wage reduction, it is believed that some improvement in revenue will have to be seen before extensive purchases are made. The local rail mill will probably resume production in a limited way within the next week.

Bars, Plates and Shapes

Lettings of fabricated structural steel and reinforcing bars are still influenced unfavorably by State and municipal budget reductions, and the trend of orders has been downward since the first of the year. Virtually no private work is coming out, and railroad buying has not yet appeared on a large scale. The smaller fabricators in the district are occupied at a low rate, but the larger interests have backlogs tonnage which has enabled them to maintain shipments at as high as 60 per cent of capacity. However, new work is not being booked at a rate sufficient to maintain this level. Prospects for road work are generally favorable, but mesh rather than bars is now used in most of such projects. This business is expected to improve after the first of the month. Buying of bar mill products by the automobile industry has declined in the last week after having expanded rather steadily since the first of the year.

Prices show no marked change, although the tendency of mills to seek 1.60c., Pittsburgh, on bars, plates and shapes is less pronounced. Most makers now consider the market as 1.50c.

Cold-Finished Bars

Business has fallen off in the last week after having shown moderate improvement during January. Production is also lower, but the price is fairly well held at 2c., Pittsburgh.

Tubular Goods

The pipe market shows no change, with shipments holding at the minimum levels established several weeks ago. Standard pipe is expected to show some improvement in the next month, but the outlook for oil country goods is less promising. The important line pipe projects before the trade are still in the formative stage. The unidentified inquiry for 200 miles of 20-in. material which came out a few weeks ago is now generally thought to be for a gas line extending into Detroit from a point in Indiana. The Continental Construction Co. continues to delay the purchase of pipe for an extension to Milwaukee. A

proposed line into Minneapolis and St. Paul has practically been abandoned because of failure to receive a franchise for distribution in those cities.

Wire Products

Demand for merchant products shows no marked change, and manufacturers' wire seems to be less active than it was in the past month. Jobbers are well stocked with nails, barbed wire and fencing, and consumer needs are not drawing upon them heavily. The price situation is considered satisfactory, although the market is being given little test.

Sheets

Leading manufacturers of sheets will make announcement of higher prices during the next week in a serious effort to stabilize the market. The increase will probably amount to as much as $3 to $4 a ton on some finishes, and it is hoped that most of the ground lost in the last three months can be regained. General demand for sheets increased slightly in the last week, but releases from the automobile industry were lighter. Electrical sheets are moving a trifle better and refrigerator stock is in better demand. The widest sizes of automobile sheets are more active than any other grade, some mills being booked for several weeks.

Tin Plate

Contracts from the leading container manufacturers are still held up, pending improved conditions in the canning industry. As a result, tin plate production is still easing off and averages less than 35 per cent of capacity. It is pointed out, however, that the canning industry is nearly always pessimistic at this time of the year and that conditions may change very quickly. Tin plate prices are still very weak, but difficulties on the Pacific Coast are said to have been settled and no large orders for foreign material have yet been placed by American can makers. However, the low quotations on Welsh material occasioned by the low rate of British exchange are a disturbing factor.

Strip Steel

Quotations on both hot-rolled and cold-rolled strip will be advanced in the next week in an effort to bring prices back to the level which prevailed at the beginning of the fourth quarter of last year. This has given the market an improved tone, although specifications have been lighter in the last week. Automotive releases are spotty, but practically all makers feel the absence of sizable Ford orders.

Coke and Coal

Heating coke has been in better demand, but no change has occurred in the market on the furnace and foundry grades. Prices are weak, but are receiving little test in a dull market. Industrial consumption of coal has not gained, but domestic grades are slightly more active.

Old Material

With the exception of the purchase of a fairly large tonnage of hydraulic compressed sheets by a local steel maker at $10.25, the market has been without feature in the last week. No. 1 heavy melting steel is not available to dealers at less than $10, and some of them are paying considerably more for shipment against old contracts. The heavy melting steel on the recent Pennsylvania Railroad list is reported to have brought prices ranging from $10.50 to $10.75, or approximately the same as last month. First quality steel is still rather scarce, but occasional distress cars give the market a weaker tone than it might otherwise have. A small sale of specialties at $11.50 reaffirms recent quotations. However, buying by the foundries is very light because of reduced operations.

Valley Mills Getting Less New Business Than During the Corresponding Period in January

YOUNGSTOWN, Feb. 9.—The aggregate volume of automobile steel releases coming to Valley mills declined slightly in the first week of the month, and business sentiment in the Valley is consequently less cheerful. Strip and steel production last week dropped off considerably, but will rise again this week in line with the policy of intermittent production schedules. January tonnage as a whole showed a fair improvement over that of December, but February business to date does not compare favorably with that of January in the case of some companies. This is hardly in line with expectations, but is partially attributable to the fact that specifications from the Ford Motor Co. continue to be delayed. This fact is prompting other automobile producers to limit their production, and the general effect on steel business in the Valleys is adverse.

Local consumers of finished steel products have increased their requirements very little since the first of the year. Most of them are running at well under 50 per cent of capacity, although one large company is maintaining a much higher rate because of the diversity of its business, and the advantage of two or three large individual orders placed some time ago. Fabricators of steel tanks are inactive, and manufacturers of railroad equipment and accessories are virtually idle.

The pipe business has been dormant since the first of the year, and January shipments were the lowest in the history of the leading makers. Standard pipe is expected to open up to some extent before the end of this month, and the prospect of line pipe orders is fairly good. Most of the pipe making units are idle, and producers' stocks are sufficient to meet current demand.

Steel ingot operations have failed to hold the peak rate reached in January, which was based on the expectation of increasing tonnage this month. Raw steel stocks of most producers have been fully replaced following year-end curtailment, and production has now been regulated to the current requirements of finishing mills. The steadiest outlook is offered by bar units, which have been able to maintain producing schedules fairly well. Sheet and strip mill requirements are naturally varied from week to week and do not offer steel plants much of an opportunity to regulate their production.

Price conditions are fairly satisfactory, except in the case of sheets and strip steel, which continue very weak. Valley mills are willing to meet competition in most cases, and have been forced to book considerable unprofitable business, particularly from the automobile industry. Quotations on wire mill products are steady, and are being tested by small-lot buying. Prices on bars and plates range from 1.50c. to 1.60c., Pittsburgh, although the lower figure seems to be more representative of the market. Semi-finished steel is very weak, reflecting the low prices being made on sheets and strip, and sellers are forced to protect their customers at figures well under the nominal market. Sheet bars are available at $26, Youngstown, and billets and slabs at $27. Lower figures are reported from time to time.

A few sales of pig iron are reported, but competition with Cleveland and Pittsburgh interests is keen, and Valley furnaces are booking little tonnage. No merchant stacks are in active production, although two are banked. The scrap market is quiet, with prices unchanged.

New England Pig Iron Trade Extremely Dull

BOSTON, Feb. 9.—Pig iron business is virtually at a standstill. With melters still holding up shipments of iron bought early last year and increasing their scrap percentages in charges, the outlook for pig iron business is not encouraging.

Old Material

Small shipments of No. 1 heavy melting steel continue to be made to the Pittsburgh district and to Worcester, Mass., and a little bundled skeleton also is going to Worcester. There is virtually no market for other kinds of scrap.

Chicago Steel Business Shows Little If Any Change for the Better

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CHICAGO, Feb. 9.—New sales of finished steel are the best in some time, but the measure of change is made by comparison with weeks when new commitments were extremely low for the time of year. The real story of the situation is told by specifications that are no larger in the aggregate and are somewhat more spotty. Ingot output is not above 26 per cent of capacity.

The rail mill in Colorado is increasing production. A Chicago unit, scheduled to go on this week, will not be turned over until early in the coming week. Rail purchases, though far below normal in tonnage, lend some encouragement to this market. A Western railroad is planning a sizable car rebuilding program, and another carrier is inquiring for prices on a small repair job. The railroads seem to offer the one bright spot, such as it is.

Price structures lack real tests all along the line. Quotations on sheets remain easy, but producers' resistance to lower levels is in evidence, and new price cards showing higher prices may soon be mailed to customers.

The scrap market shows a mixed tendency. The total movement has not diminished, but inquiry is lagging and dealers are undecided as to what attitude they should take toward the market. Heavy melting is off 25c. a ton, but cast iron borings, on the first mill sale in over a year, are up $1 a ton.

Although new sales of finished steel have gained, contract specifications do not increase.

* * *

Sharp drop occurs in orders of the farm implement industry, suggesting curtailment of operations.

* * *

Colorado rail mill starting production, but resumption of a Chicago mill is postponed until next week.

* * *

Ingot output for district has not risen above 26 per cent of capacity.

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Pig Iron

The improvement in Northern foundry iron shipments is retarded. Sales are less active than earlier in the month. On the other hand, inquiries are on the increase, so sellers are inclined to view the situation as one which still holds hope of progress. Prices are fairly steady at $16.50 a ton, base, local furnaces. A few inquiries are out for small lots of Southern iron, which is being quoted at $10 a ton, Birmingham. Competition from this source is a strong factor to the west of Chicago, such as points in Iowa, where quotations figure back to the equivalent of about $14 a ton, Chicago.

Bolts, Nuts and Rivets

Demand for these commodities has slackened perceptibly in the past few days. A few shipments are being made to railroad shops, where repair programs are larger, but the automobile trade is taking smaller quauties, and there is a sharp drop in releases by manufacturers of farm implements, who appear to be close to curtailment of operations.

Reinforcing Bars

Demand for reinforcing bars is practically at a standstill. Another Illinois road letting will be made late this month. Contractors have a round tonnage of paving bars to place for work to be started next spring. Several jobs which are looked upon as tests for prices are still open, thereby giving support to the thought that dealers are subbornly resisting a drop to a lower level.

Cast Iron Pipe

A slight turn for the better is noted in this market in the form of more numerous inquiries and sales of carlots, many of which are destined for private consumers. Present quotations are holding on business of this kind. Sellers are looking forward to orders from railroads, though it is improbable that much of this business will develop until early in the spring. Middletown, Ohio, changed its specifications and, instead of buying cast iron pipe, it placed orders for 150 tons of 12-in. steel pipe. The only new inquiry of size is for 1000 tons for delivery to Fort Wayne, Ind.

Structural Material

Prospects for an upturn in construction are poor. Wisconsin is shaping a highway bridge program that will take upward of 2000 tons and the Illinois State Highway Department is preparing plans for several bridges, on which figures will be taken in the early spring. At Milwaukee a viaduct and a high school account for the bulk of current lettings. Local shops are having difficulty in keeping any kind of a schedule in operation and fabricators to the west are virtually without work.

Rails and Track Supplies

The Southern Pacific has ordered 20,000 tons, which will be furnished by Colorado and Birmingham mills. The Colorado unit, which participated heavily in the Santa Fe order, is stepping up production. The Chicago mill that had expected to resume operations this week found releases still too light, and plans are to begin rolling rails next week. The Santa Fe has in mind resuming construction work on its new line from Boise City, Okla., to Las Animas, Colo. A few small track accessory orders have been entered at mills.

Plates

A significant development in the pipe market is furnished by Middletown, Ohio, which has purchased 150 tons of steel pipe when it had originally planned on using the cast product. Minneapolis has ordered 2700 tons of steel pipe. The plate market is dull. Recent inquiry for tanks is still open, and no new business of this character has developed. It is reported that the Chicago Great Western will rebuild 1600 cars. So far new railroad shop work has not been productive of sizable steel orders.

Bars

A slightly broader use of bars by miscellaneous consumers is tending to offset a drop in consumption by some automobile plants near Chicago. New buying of mild and alloy steel bars is slightly expanding. Use of rail steel bars is irregular, and mill schedules are variable. Orders for fence posts made from old rails are spotty and far below seasonal expectations.

Sheets

Prices continue to show weakness in a market that does not support mill operations above 25 per cent of capacity. No. 10 gage heavy cold-rolled can be had as low as 2.20c. a lb.,

Chicago mills, and galvanized at 2.85c. One Chicago producer has in mind issuing a new price card within the next few days. Plans are to show minimums of 2.40c. a lb., Chicago mill, for No. 24 hot-rolled annealed and 2.95c. for galvanized.

Wire Products

The production pace has been adjusted downward to about 25 per cent of capacity. Mill warehouses are well stocked. Current sales and specifications remain light, but sellers are still hopeful that a good spring demand will develop. They are mindful, however, that an upward demand, especially in rural districts, must be preceded by improved credit conditions. Many small towns are at present without any kind of banking facilities.

Old Material

Mills are again buying heavy melting steel at maximum prices that are 25c. a ton below recent quotations. New sales are in the range from $7 to $7.25 a gross ton, delivered. In contrast with heavy melting steel, cast iron boring prices are higher on a 3000-ton purchase by a mill, the first in over a year. This change in the market seems destined to check, if not make almost impossible, the further accumulation of borings on local docks. A few cars of hydraulic sheets have been placed at $6.50 a gross ton, delivered.

Canadian Steel Business Has Minor Improvement

TORONTO, Feb. 8.—Indications of improvement are showing in some branches of the Canadian iron and steel industry. The Algoma Steel Corpn., Sault Ste. Marie, Ont., is securing new lines of business for its merchant mills, lines that had previously not been made here. The orders include steel bars for reinforcing on the big dam for the Abitibi Power & Paper Co. at Abitibi Canyon, Ont., and new shapes used for clamping guy wires to posts. A contract also has been received for bumpers for new Ford cars, and in addition other business has been received from the motor industry, while additional business of this nature is pending.

Pig Iron

In this market business is generally without change. Melters are adhering strictly to hand-to-mouth buying and are purchasing in single car lots only. Prices are steady.

Old Material

General stagnation in business holds throughout the iron and steel scrap markets. Dealers state that they find very little demand for old material. Steel scrap is at a standstill. Prices are unchanged, with little scrap being offered.

Eastern Pennsylvania Steel Operations Not Improved

Inquiries More Numerous, But Little Business Results—Higher Quotations on Sheets Are Named

PHILADELPHIA, Feb. 9.—The feature of the market here is the firmer stand producers are taking on prices. This is especially true in the sheet trade. A strong effort is being made to move the levels upward $3 per ton on No. 24 gage hot-rolled annealed and cold-rolled material and $2 on galvanized sheets. Plate, shape and bar makers also are showing increased resistance to pressure for further reductions. So far no new business of sizable quantities has come out to test the stiffer position of the mills.

The announcement that the Pennsylvania Railroad has applied to the Reconstruction Finance Corpn, for loans of $5,000,000 per month for an indefinite period has had a mildly heartening effect. The money, if loaned, will be used to complete electrification between New York and Washington first and subsequently to buy equipment, the amount of which is not known. The electrification project and operations on the railroad's station in Philadelphia, however, will not involve much new material, since the bulk of it has been purchased.

The pig iron market has shown only slightly increased activity in inquiries, with no important sales reported. The scrap market is easier in several grades.

Steel operations are unchanged at about 18 per cent of capacity.

Pig Iron

Melters have put out a few more inquiries, but no transactions outside of carlots have been closed. An inquiry for 10,000 tons of gray forge has been withdrawn. The dullness in the market leaves the price situation uncertain. Reports of low prices of foreign iron also add to the uncertainty. Foreign iron is becoming more important in competition. It is understood that a tonnage is on the seas en route to New England ports.

Plates, Shapes and Bars

There has been a noticeable increase in inquiries for small lots from miscellaneous sources. They are most marked in plates. Producers report that virtually no new business is being booked and are inclined to think the greater number of inquiries reflects an effort to test prices. A firmer position is being taken by the mills in attempting to hold existing levels at 1.50c., Pittsburgh. Makers are doubtful that much buying by the railroads will develop before the last half, if then. The plan of the Pennsylvania to get loans from the Reconstruction Finance Corpn. to proceed with its electrification project and later to buy equipment has created interest and the hope that it is an omen of a substantial buying movement on the part of the railroads.

Sheets

Mills have taken a determined stand to move up prices. They are quoting No. 24 hot-rolled annealed at 2.30c., Pittsburgh, an advance of $3 a ton, and No. 24 galvanized at 2.85c., an advance of $2 a ton. Other grades that have lately been extremely weak are being advanced proportionately. No new business has been taken at the higher quotations. There has been slightly greater activity the past week, mostly in automobile sheets.

Warehouse Business

Prices are unchanged, and inquiry is slight. The January tonnage out of warehouse was about the same as in December, but not quite so satisfactory from a point of value to jobbers.

Imports

Importations at Philadelphia last week were as follows: Pig iron from British India, 427 tons; steel plates, 20 tons; steel bands, 12 tons; floor plates, 29 tons; steel bars, 5 tons, and structural shapes, 217 tons, all from Belgium; galvanized steel strips from England, 3 tons.

Old Material

The market continues dull, and several grades have become softer. Old hydraulic compressed material has declined 50c. to $5.50 a ton, and the price range on No. 1 and No. 2 heavy melting steel has narrowed. Light tonnages are moving on contracts to mills. Consumers generally are withholding shipping orders.

Railroad Equipment

Thunder Bay Quarries Co. has ordered four 50-ton air dump cars from Koppel Industrial Car & Equipment Co.

Chicago Great Western is planning to rebuild 1600 cars.

Belt Railway of Chicago is taking prices on repairs to 100 hopper cars.

The Chamber of Commerce of the United States will hold its twentieth annual meeting in San Francisco, May 17 to 20. D. A. Skinner, 1615 H Street, N. W., Washington, is secretary.

Cleveland Steel Business Slower as Automobile Buying Declines

Operations Continue at 38 Per Cent of Capacity—Efforts Being Made to Establish Sheet Prices on Higher Level

CLEVELAND, Feb. 9.—Production by some of the automobile manufacturers in the Michigan territory is slowing down, according to reports from Detroit. While reduction of schedules was not unexpected, it is, of course, an unfavorable factor in the finished iron and steel market. Motor car sales and attendance at automobile shows appear to have offered considerable encouragement, but it will be some time before the seasonal buying gets well under way, and, with recent fair production by most of the motor car manufacturers, dealers have been stocked up. The manufacturers evidently intend to go somewhat slower to avoid over-stocking until they can gage the volume of retail sales.

Orders for steel from the motor car industry during the week were light. Some of the finishing mills making sheets and strip steel are well cleaned up on orders, and production is being curtailed this week. However, recent operations of Cleveland steel plants are being maintained, these running at 38 per cent of ingot capacity this week, or the same as during the two previous weeks.

Activity in the building field continues very light. However, recent wage reductions among the local building trades is expected to stimulate building work in the spring. The State of Ohio has completed the awarding of contracts in connection with its winter highway bridge and road building program, but is expected to inaugurate various other highway projects in the early spring.

The Nickel Plate Railroad has not yet purchased its rails. Its inquiry also includes track fastenings. Railroad demand for small miscellaneous lots of steel doubtless will be stimulated by the starting up next week of the Collinwood repair shops of the New York Central.

Attempts to put prices of sheets and perhaps strip steel on a more stable basis and higher on some grades are under way, although little definite progress has yet been made. One important producer has named new prices on some grades of sheets, effective immediately. The prices announced are 2.30c., Pittsburgh, for No. 24 hot-rolled annealed, or $3 a ton advance; 2.85c. for galvanized, 1.60c. for hot-rolled and 1.75c. for hot-rolled annealed, and 3c. for long ternes.

Pig Iron

The market is sluggish after a two-weeks' period of fair activity. Very little inquiry is pending. The recent improvement in shipments is being maintained, with the motor car industry taking most of the iron. Inactivity in the building field is being reflected in little demand for pig iron from manufacturers of heating equipment. Prices are steady at $15 to $15.50, Cleveland, for foundry and malleable iron for outside shipment and $16 for local delivery. A producer in an adjoining territory is seeking business in this district. Weakness in silvery iron and ferrosilicon has resulted from competition of producers outside of the Jackson County district.

Iron Ore

Movement of ore from Lake Erie docks to interior furnaces is very light. During January dock shipments were 64,323 tons, compared with 140,824 tons during the same month last year. The balance on docks Feb. 1 was 5,809,903 tons, compared with 6,189,529 on the same date a year ago. Shipments from Lake Erie ports during the season until Feb. 1 were 11,252,476 tons, compared with 23,414,028 tons during the same period last year.

Sheets

Demand shows virtually no change. Buying is well distributed among consuming industries, and orders are confined to small lots. Business from manufacturers of refrigerator boxes has picked up and some tonnage in electrical sheets is coming from the vacuum cleaner industry. While prices are no firmer, an effort probably will be made to put advances into effect. Hot-rolled annealed sheets are rather freely quoted at 2.15c., Pittsburgh, and orders are reported placed by steel barrel manufacturers at 2.05c.

Strip Steel

Hot-rolled strip continues to move fairly well in small lots to makers of automobile parts and accessories. Prices appear fairly steady at 1.40c. to 1.45c., Pittsburgh, for wide strip and 1.50c. to 1.55c. for narrow. However, there are reports of weakness on wide strip in the Detroit territory, with concessions from the 1.40c. price. Cold-rolled strip remains dull, with prices unchanged at 1.85c. to 2c., Cleveland.

Bars, Plates and Shapes

While tonnage booked so far this month is ahead of that in the corresponding period of January, the market does not show much life. Operations by consuming industries have improved little, if any, and buyers are ordering steel only in small lots. Prices are steady at 1.55c., Cleveland, for steel bars and 1.50c. to 1.60c., Pittsburgh, for plates and shapes.

Semi-Finished Steel

The market on sheet bars is weak and unsettled. While $26, Cleveland and Youngstown, is nominally quoted, reports indicate that $25 may be more representative of the market.

Bolts, Nuts and Rivets

Demand continues slow, showing little change from recent weeks. Orders from the motor car industry are only moderate. Weakness in prices continues.

Old Material

Several Valley district mills and a local consumer are taking restricted shipments, which have resulted in some activity among dealers. There is no new consumer demand. For delivery to Valley mills dealers are paying $9.50 for No. 1 heavy melting steel, $8.50 for No. 2, $7 to $7.25 for machine shop turnings and $9 to $9.25 for compressed sheet steel. Machine shop turnings have declined 25c. a ton and railroad malleable is down $1 or more a ton.

Buffalo Steel Plants Increase Operations

BUFFALO, Feb. 9.—The situation in pig iron is unchanged. January shipments were below those of December. There have been some 100-ton lots sold. Most of the Buffalo iron going into the East is netting the furnace $15 a ton. Foreign iron is a disturbing factor in New England. The active Republic stack will go from reduced blast to full blast this week.

Steel

Late last week the Lackawanna plant of Bethlehem Steel Corpn. increased its open-hearth operation to eight furnaces, and an additional furnace may be put on this week. Republic Steel this week increased its open-hearth operation to four furnaces in its alternating schedule. Wickwire Spencer Corpn. is operating one open-hearth.

Old Material

Two of the Buffalo mills have lifted their suspensions on shipments of borings and turnings. It is understood that there has been some selling of off-grade No. 2 heavy melting steel outside of the city. Considerable scrap normally shipped to Buffalo from the East is being diverted to Weirton. A few sales of stove plate and No. 1 machinery cast are reported at the market.

New York Steel Buyers Informed of Advance on Sheet Steel

Prices to Be Raised $3 a Ton on Some Grades—Foreign Tin Plate a Disturbing Factor—Small "War Orders" Placed

NEW YORK, Feb. 9.—In a steel market that is duller than in January the chief interest lies in the efforts being made this week by some of the producers of sheet steel to advance prices. It is stated that the new prices, which probably will be announced by many of the mills before the end of the week, will not disturb contracts for the quarter, which have generally been written down to the recent low quotations, but all orders not covered by contracts will be affected. Advances of $2 or $3 a ton are contemplated. The minimum on No. 24 hot-rolled annealed sheets will be advanced to 2.30c., Pittsburgh. Recent sales to barrel manufacturers have been at 2.05c. and 2.10c., although 2.15c. has applied on the general run of orders. Galvanized sheets will be quoted at 2.85c., against recent quotations of 2.70c. and 2.75c. No. 10 hot-rolled will be 1.60c., light cold-rolled 2.85c. and heavy cold-rolled 2.25c. Long ternes probably will be put up to 3c.

Although a time of subnormal demands is not considered favorable for an advance in prices, the sheet trade accomplished such a move last July under similar conditions, and sheet prices remained fairly stable during the third quarter and part of the fourth. Most of the recent weakness has developed since Dec. 1. The decline in many grades has amounted to $5 a ton or more.

Foreign competition in tin plate and some other products is becoming more disturbing along the Atlantic Seaboard. Several lots of Welsh tin plate are said to have been sold at about $3 per base box, Atlantic port, duty paid. A much larger amount is reported to have been sold for delivery on the Pacific Coast. Imports of floor plates at about 2c. a lb., against recent quotations of 3.45c., Coatesville, Pa., on the domestic product have also become an important factor in that trade.

The Far Eastern situation has resulted in some small orders for war material, including a moderate amount of special steel for small arms. One or two shell steel contracts are also said to have been placed.

Pig Iron

Demand continues to be chiefly for limited quantities for early delivery. Several orders for delivery through second quarter have been placed, but buyers generally are still hesitant about purchasing beyond their immediate needs. Total bookings in the past week, at 2500 tons, compare with 2000 tons the week before and 2500 tons two weeks ago. A 3000-ton cargo of Royal Dutch iron, part of which has already been sold, is expected to arrive this week at Bridgeport, Conn. Prices are unchanged.

Reinforcing Bars

Prices are unchanged at 1.50c., Pittsburgh, or 1.85c., delivered New York. Awards in the past week included 525 tons of bars for a sewer project on Tenth Avenue and Forty-ninth Street to National Bridge Works, and 445 tons for a vault in the First National Bank Building, which will be fabricated by Rivet-Grip Co. and erected by York Safe & Lock Co. No new projects requiring sizable tonnages of bars are reported.

Old Material

Demand for all grades continues to lag. Shipments to most of the eastern Pennsylvania mills are still held up. A tonnage of scrap is reported to have been sold for delivery to Japan.

St. Louis Business Is Light in All Lines

ST. LOUIS, Feb. 9.—New business in pig iron continues to be light. However, shipping instructions against contracts received by the St. Louis Gas & Coke Corpn. are reported to be fully equal to those of a month ago. Melters in the district also are said to have a better feeling as to the future, and makers are hopeful this will be translated into orders soon. Stove plants are said to be working on gas heaters for early delivery, while others are engaged in making up samples of heaters for delivery late in the summer to mail order and chain stores. Jobbing foundries have very little business. Pig iron prices are unchanged.

Finished Steel

Open-hearth furnaces in the district now in operation continue at about 14 per cent of capacity. No immediate increase is in sight.

Fabricators of structural steel in the district are said to be operating at between 20 to 25 per cent of capacity, mostly on small jobs. No new sizable projects are before the market.

The price of 1.70c. a lb., Chicago, on plates, shapes and bars is said to be maintained on the general run of business, but attractive tonnages are sometimes taken at a lower price.

Old Material

An East Side mill is expected to come into the market this week for approximately 5000 tons of heavy melting steel, which is about the only business pending. Stocks of scrap in the hands of consumers are ample for the present rate of operations. Not much buying is expected until there is a better demand for finished products. Railroad lists, which have been small for some time, increased markedly this week with the following: Chesapeake & Ohio, 6900 tons; Illinois Central, 1611 tons; Wabash, 1142 tons; Kansas City Southern, 125 tons; Chicago, Milwaukee, St. Paul & Pacific, 50 carloads; Mobile & Ohio, 32 carloads; New York, Chicago & St. Louis, 24 carloads; Pullman Co. (St. Louis), 20 carloads; Chicago, Indianapolis & Louisville, 10 carloads. Scrap prices are unchanged.

Cincinnati Pig Iron Orders at January Level

CINCINNATI, Feb. 9.—Demand for pig iron in this district is holding to the level of January. New business the past week totaled slightly more than 2000 tons, and included orders for 650 tons of Northern iron from an Indiana melter and 500 tons from a southern Ohio consumer. Shipments have improved moderately, although the melt continues to be low. Machine tool foundries are without improvement, but some increase in automotive foundry operations is reported.

Old Material

A few sales of No. 2 steel, sheet clippings and blast furnace scrap the past week reflected a firmer undertone in price schedules. Shipments are small.

Cast Iron Pipe

Manchester, N. H., awarded 200 tons of 6, 8 and 12-in. to United States Pipe & Foundry Co.

Hawthorne, N. Y., is taking bids until Feb. 19 on about 16 miles of 6-in. and larger sizes.

Brooklyn Borough Gas Co., Coney Island, N. Y., is in the market for its annual requirements of gas pipe.

Bethlehem, Pa., rejected all bids on 200 tons of 6, 8 and 12-in.

Fort Wayne, Ind., is inquiring for 1000 tons of 8 to 24-in.

Flora, Ill., is in the market for 35,000 ft. of 12-in.

Long Beach, Cal., opens bids on Feb. 9 for 2800 tons of 6, 8 and 12-in.

San Francisco opens bids on Feb. 11 for 1330 tons of 6 and 8-in.

Fabricated Structural Steel

New Projects of 7000 Tons—Bookings Lower at 5250 Tons

THE volume of fabricated structural steel lettings the past week was the lowest recorded, totaling only 5250 tons. More than half of this tonnage is for bridge work, mostly in the Central West. New projects call for about 7000 tons, compared with 6000 tons in the previous week. The largest inquiries include 2000 tons for bridges in Wisconsin and 1000 tons for an auditorium in Grand Rapids, Mich. Awards follow:

NORTH ATLANTIC STATES

Westfield, Mass., 750 tons, State bridge, to Boston Bridge Works, Inc.

Wellesley-Needham, Mass., 100 tons, State bridge, to Albany Bridge Co.

Brooklyn, 250 tons, highway bridge, to Phoenix Bridge Co.

West Haverstraw, N. Y., 325 tons, reconstruction home, to Lackawanna Steel Construction Co., previously reported to Ingalls Iron Works.

THE SOUTH

State of Texas, 600 tons, Guadalupe County bridge, to McClintic Marshall Corpn.

CENTRAL STATES

South Chicago, Ill., 160 tons, billet yard, International Harvester Co., to Wisconsin Bridge Co.

Rock Island, Ill., 700 tons, lock and dam on Mississippi River, to an unnamed bidder.

Milwaukee, 525 tons, viaduct, to Milwaukee Bridge Co.

State of Missouri, 1000 tons, two highway bridges, to Stupp Brothers Bridge & Iron Co.

State of Ohio, 665 tons, highway bridges; 175 tons to International Derrick & Equipment Co.; 160 tons to Champion Bridge Co. and smaller awards to other fabricators.

WESTERN STATES

Los Angeles, 500 tons, Chrysler building, first unit, to Consolidated Steel Co.

Yountville, Cal., 100 tons, Veterans' Home, to McClintic-Marshall Corpn.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Chelsea, Mass., 125 tons, Soldier's Home additions.

Boston, 102 tons, police station.

Darby, Pa., 900 tons, Mercy Hospital; John McShain, Philadelphia, general contractor.

Lancaster, Pa., 275 tons, filtration plant; O. B. Rote Co., general contractor.

Polk, Pa., 355 tons, infirmary; R. B. McDaniel Co., New Brighton, Pa., low bidder.

Norristown, Pa., 300 tons, Norristown General Hospital.

SOUTH AND SOUTHWEST

Crestview, Fla., 550 tons, highway bridge.

Somerville, Tex., 115 tons, highway bridge.

Corpus Christi, Tex., 350 tons, sheet steel piling for cribs to protect bascule bridge, bids to be opened Feb. 29.

Picher, Okla., 200 tons, building for Eagle-Picher Mining & Smelting Co.

CENTRAL STATES

Grand Rapids, Mich., 1000 tons, auditorium.

Terre Haute, Ind., 400 tons, post office.

Davenport, Iowa, 400 tons, post office.

State of Wisconsin, 2000 tons, highway bridge work.

Sangammon County, Ill., 500 tons, State highway bridge.

Toledo, Ohio, 250 tons, Stein Building.

WESTERN STATES

Seattle, 1688 tons, University Avenue bridge; General Construction Co. low bidder on general contract.

Portland, Ore., 200 tons, Irvington School.

Los Angeles, 125 tons, Laurel Canyon apartment building in Hollywood.

Los Angeles, 175 tons, store for W. T. Grant Co.

HAWAII

Pearl Harbor, 500 tons, naval aircraft shop; Newport Contracting & Engineering Co. low bidder on general contract.

FABRICATED PLATE

Sunnyvale, 1000 tons, helium gas holder for naval dirigible dock, to Stacey Mfg. Co.

Sunnyvale, 100 tons, tank and tower for naval dirigible dock, to Fittsburgh-DesMoines Steel Co.

Seattle, 200 tons, overflow pipe for West Seattle reservoir, to Puget Sound Machinery Depot.

NEW PROJECTS

Los Angeles, 325 tons, penstock for city water system.

Birmingham Iron and Steel Trade Fails to Maintain the Minor Improvement in January

BIRMINGHAM, Feb. 9.—The opening week of February failed to maintain the January trend in pig iron, merchant producers reporting more pronounced quietness both in bookings and shipments. Foundry operations in this section vary from week to week and are dependent on day-to-day orders. Pipe plants, especially, are now working on close schedules. Woodward Iron Co., which closed down completely on Dec. 15, still has no plans for resumption. Quotations remain at $11 for district tonnage. Furnace operations are unchanged, with six in blast.

Steel

Bookings of the two steel manufacturers in this district were only of routine nature last week. One, which had reported improvement the preceding week on account of several special orders, did not continue the previous rate. Wire products demand is somewhat better. Lately this demand has been largely from the retail and country trade, but now manufacturing and specialty requirements have improved. Fabricators are still without new business of importance. Ingalls Iron Works is starting shipments this week on a 2000-ton order for Duncan Field, Tex., previously reported. Twelve open-hearths were operated last week, the same number as in the preceding week. The Tennessee company operated six at Ensley and four at Fairfield, while Gulf States Steel had two on at Alabama City.

Old Material

There has been little activity during the past several weeks. Contract shipments are limited, and buying is almost negligible.

Pacific Coast Inquiries Total 15,600 Tons

SAN FRANCISCO, Feb. 8, 1932.—Bids were opened the past week on more than 3000 tons of structural steel for major construction projects; contracts were placed for 1300 tons of plates, while new inquiries involve a total of 15,600 tons of material for placement during coming months, divided as follows: 1600 tons of reinforcing bars, 560 tons of structural shapes, 9350 tons of plates and approximately 4100 tons of cast iron pipe.

Long Beach will open bids Feb. 9 on 2800 tons of 6, 8 and 10-in. cast iron pipe, and San Francisco on Feb. 11 for over 1300 tons of 6 and 8-in. These are the first important inquiries for cast water pipe in several weeks.

Stockton, Cal., will buy in the open market 900 tons of 90-lb. No. 1 and No. 2 relaying rails for its port belt line.

The Department of Water and Power of Los Angeles has awarded a contract for upward of 400 tons of 6 and 8-in. wrought steel pipe for service stock with six local supply houses as follows: California Hardware Co., Union Hardware & Metal Co., Hacker Pipe & Supply Co., Crane Co., Republic Supply Co. and Holdeman Co.

In connection with the Pine Canyon Dam project of Pasadena, Cal., it is estimated that 9000 tons of plates will be required for the pipe line. This contract will be placed in the fall. Construction of the dam will proceed immediately, and 1500 tons of reinforcing bars will be needed.

Reinforcing bars, line pipe and oil well casing continue especially weak in southern California, with overstocks and a greater number of distributing outlets than the market or possible volume at present justifies.

Detroit Scrap Dull

DETROIT, Feb. 9.—With consumers manifesting slight interest, the local scrap market is dull. Steel mills are purchasing small lots only when price concessions are made. Quotations are unchanged.

▲▲▲ Prices of Finished and Semi-Finished Steel,

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh mill.....1.50c.
F.o.b. Chicago.....1.70c.
Del'd Philadelphia .....1.81c. to 1.91c.
Del'd New York.....1.85c. to 1.95c.
F.o.b. Cleveland.....1.55c.
F.o.b. Lackawanna .....1.60c. to 1.70c.
F.o.b. Birmingham .....1.70c.
C.i.f. Pacific ports.....2.00c.

Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.....1.50c. to 1.60c.
F.o.b. Birmingham, mill lengths.....1.75c.
F.o.b. Cleveland .....1.40c. to 1.50c.

Rail Steel

F.o.b. mills, east of Chicago dist...1.30c. to 1.35c.
F.o.b. Chicago Heights mill.....1.50c. to 1.60c.
Del'd Philadelphia .....1.49c. to 1.59c.

Iron

Common iron, f.o.b. Chicago.....1.70c.
Refined iron, f.o.b. P'gh mills.....2.75c.
Common iron, del'd Philadelphia.....2.11c.
Common iron, del'd New York.....2.15c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mill.....1.50c.
F.o.b. Chicago.....1.70c.
F.o.b. Birmingham .....1.70c.
Del'd Cleveland.....1.7035c. to 1.8035c.
Del'd Philadelphia.....1.6935c. to 1.7435c.
F.o.b. Coatesville .....1.60c. to 1.65c.
F.o.b. Sparrows Point.....1.60c. to 1.70c.
F.o.b. Lackawanna .....1.60c. to 1.70c.
Del'd New York.....1.798c. to 1.898c.
C.i.f. Pacific ports.....1.80c. to 1.85c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mill.....1.50c.
F.o.b. Chicago.....1.70c.
F.o.b. Birmingham .....1.70c.
F.o.b. Lackawanna .....1.60c. to 1.70c.
F.o.b. Bethlehem .....1.60c. to 1.70c.
Del'd Cleveland.....1.7035c. to 1.8035c.
Del'd Philadelphia.....1.5995c. to 1.6495c.
Del'd New York.....1.76775c. to 1.86775c.
C.i.f. Pacific ports (standard).....2.05c.
C.i.f. Pacific ports (wide flange).....2.15c.

Sheet Steel Piling

Base per Lb.

F.o.b. Pittsburgh.....1.90c.
F.o.b. Chicago mill.....2.00c.
F.o.b. Buffalo.....2.00c.

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential per 100 Lb.
2000	(1¼% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bar	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Cold-Finished Bars

Base per Lb.

Bars, f.o.b. Pittsburgh mill.....2.00c.
Bars, f.o.b. Chicago.....2.00c.
Bars, Cleveland .....2.00c.
Bars, Buffalo .....2.00c.
Shafting, ground, f.o.b. mill.....*2.35c. to 3.30c.

*According to size.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot-Rolled

Base per Lb.

No. 10, f.o.b. Pittsburgh.....1.60c. to 1.65c.
No. 10, f.o.b. Chicago mills.....1.70c. to 1.75c.
No. 10, del'd Philadelphia.....1.91c. to 2.01c.
No. 10, f.o.b. Birmingham.....1.75c. to 1.85c.
No. 10, c.i.f. Pacific Coast ports.....2.35c.

Hot-Rolled and Annealed

No. 10, Pittsburgh.....1.75c. to 1.80c.
No. 10, Chicago mills.....1.85c. to 1.90c.
No. 10, Birmingham.....1.85c. to 1.95c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh.....2.15c. to 2.25c.
No. 24, f.o.b. Chicago mills.....2.25c. to 2.35c.
No. 24, del'd Philadelphia.....2.46c. to 2.56c.
No. 24, f.o.b. Birmingham.....2.45c. to 2.55c.
No. 24, c.i.f. Pacific Coast ports.....2.90c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh.....2.10c. to 2.20c.
No. 10 gage, f.o.b. Chicago mills..2.20c. to 2.30c.
No. 10 gage, del'd Philadelphia....2.41c. to 2.51c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh....2.65c. to 2.75c.
No. 20 gage, f.o.b. Chicago mills..2.75c. to 2.85c.
No. 20 gage, del'd Philadelphia....2.96c. to 3.06c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....2.80c. to 2.90c.

Steel Furniture Sheets

No. 10, f.o.b. Pittsburgh.....2.50c. to 2.55c.
No. 20, f.o.b. Pittsburgh.....3.05c. to 3.15c.

(Prices on furniture stock include stretcher leveling but not resquaring.)

Galvanized Sheets

No. 24, f.o.b. Pittsburgh.....2.75c. to 2.80c.
No. 24, f.o.b. Chicago mills.....2.85c. to 2.90c.
No. 24, del'd Philadelphia.....3.06c. to 3.11c.
No. 24, f.o.b. Birmingham.....2.95c.
No. 24, c.i.f. Pacific Coast ports.....3.40c.

Long Ternes

No. 24, unassorted, 8-lb. coating, f.o.b. P'gh .....2.90c.

Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh.....2.60c.
No. 20, f.o.b. Pittsburgh.....3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....2.50c. to 2.55c.
No. 28, Chicago mill.....2.60c. to 2.65c.

Tin Plate

Base per Box

Standard cokes, f.o.b. P'gh district mills...$4.75
Standard cokes, f.o.b. Gary..... 4.85

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. $9.50 | 25-lb. coating I.C.$14.10
15-lb. coating I.C. 12.00 | 30-lb. coating I.C. 14.90
20-lb. coating I.C. 13.00 | 40-lb. coating I.C. 16.70

Hot-Rolled Hoops, Bands and Strips

Base per Lb.

6 in. and narrower, Pittsburgh...1.50c. to 1.55c.
Wider than 6 in., P'gh.....1.40c. to 1.45c.
6 in. and narrower, Chicago.....1.60c. to 1.65c.
Wider than 6 in., Chicago.....1.55c. to 1.65c.
Cooperage stock, P'gh.....1.60c. to 1.70c.
Cooperage stock, Chicago.....1.70c. to 1.80c.

Cold-Rolled Strips

F.o.b. P'gh.....1.90c. to 2.00c.
F.o.b. Cleveland.....1.85c. to 2.00c.
Del'd Chicago .....2.20c. to 2.30c.
F.o.b. Worcester.....2.05c. to 2.15c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland .....2.85c. to 2.90c.

STEEL PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	47	21½	¼ and ⅜	+11	+36
¼ to ⅜	53	27½	½	23	5
½	58	44½	¾	28	11
¾	62	50½	1 and 1¼	31	15
1 to 3	64	52½	1½ and 2	35	18

Lap Weld

2	57	45½	2	23	9
2½ to 6	61	49½	2½ to 3½	28	13
7 and 8	58	45½	4 to 6	30	17
9 and 10	56	43½	7 and 8	29	16
11 and 12	55	42½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+13	+48
¼ to ⅜	49	32½	½	23	7
½	55	44½	¾	28	12
¾	60	49⅜	1 to 2	34	18
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	29	13
2½ to 4	59	48½	2½ to 4	34	20
4½ to 6	58	47½	4½ to 6	33	19
7 to 8	54	41½	7 and 8	31	17
9 and 10	47	34½	9 to 12	21	8
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5 and 2½%, and on galvanized by 1½ points with supplementary discounts of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30% base (carloads)... 55
Carbon, 0.30% to 0.40% base..... 50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Bolts, Nuts, Coke, Coal, Fuel Oil, Cast Iron Pipe

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)
(After Dec. 31, extras of 10c. a 100 lb. on mixed and joint carloads, 25c. on pool carloads and 40c. on less than carloads will be applied on all merchant wire products.)

To Manufacturing Trade

Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

	Base per Keg
Standard wire nails	$1.95
Smooth coated nails	1.95
Galvanized nails	3.90

	Base per Lb.
Smooth annealed wire	2.35c.
Smooth galvanized wire	2.80c.
Polished staples	2.50c.
Galvanized staples	2.75c.
Barbed wire, galvanized	2.60c.

Woven wire fence, Nos. 9 and 11 gage, per net ton $55.00
Woven wire fence, No. 12½ gage and lighter, per net ton 60.00
Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

RAILS AND TRACK SUPPLIES

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	34.00
Light (from rail steel), f.o.b. mill	32.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝-in. and larger	$2.60
Spikes, ½-in. and larger	2.60
Spikes, boat and barge	2.80
Tie plate, steel	1.85
Angle bars	2.75
Track bolts, to steam railroads	3.50
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	73, 10 and 10
†Carriage bolts	73, 10 and 10
Lag bolts	73, 10 and 10
Plow bolts, Nos. 1, 2, 3 and 7 heads	73, 10 and 10
Hot-pressed nuts, blank or tapped, square	73, 10 and 10
Hot-pressed nuts, blank or tapped, hexagons	73, 10 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	73, 10 and 10
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	73, 10 and 10
Semi-finished hexagon castellated nuts, S.A.E.	73, 10 and 10
Stove bolts in packages, P'gh	85 and 10
Stove bolts in packages, Ch'go	85 and 10
Stove bolts in pkgs., Cleveland	85 and 10
Stove bolts in bulk, P'gh	85, 10 and 2½
Stove bolts in bulk, Ch'go	85, 10 and 2½
Stove bolts in bulk, Cleveland	85, 10 and 2½
Tire bolts	60, 10 and 10

Discounts of 73, 10 and 10 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.25
F.o.b. Chicago	2.35

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S.S. thread	85, 10 and 10
Upset hex. cap screws, S.A.E. thread	85, 10 and 10
Upset set screws	80, 10 and 5
Milled studs	70

SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$27.00
Rerolling, 4-in. and under 10-in., Youngstown	27.00
Rerolling, 4-in. and under 10-in., Cleveland	27.00
Rerolling, 4-in. and under 10-in., Chicago	29.00
Forging quality, Pittsburgh	$33.00 to 34.00
Forging quality, Youngstown	33.00

Sheet Bars

(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$26.00
Youngstown	26.00
Cleveland	$25.00 to 26.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$27.00
Youngstown	27.00
Cleveland	27.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.50c. to 1.60c.
Universal	1.50c. to 1.60c.
Sheared	1.50c. to 1.60c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$37.00
Cleveland	37.00
Chicago	38.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.25
Foundry, f.o.b. Connellsville prompt	$3.25 to 4.50
Foundry, by-product, Ch'go ovens	7.50
Foundry, by-product, New England, del'd	10.50
Foundry, by-product, Newark or Jersey City, delivered	8.70 to 9.10
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland, delivered	8.27
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.50
Mine run coking coal, f.o.b. W. Pa.	1.50 to 1.60
Gas coal, ¾-in., f.o.b. Pa. mines	$1.70 to $1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	0.40 to 0.60
Gas slack, f.o.b. W. Pa. mines	0.65 to 0.75

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	3.50c.
No. 4 industrial	3.00c.
Per Gal. f.o.b. Baltimore	
No. 3 distillate	3.50c.
No. 4 industrial	3.25c.
Per Gal. del'd Chicago	
No. 3 industrial fuel oil	2.75c.
No. 5 industrial fuel oil	2.60c.
Per Gal. f.o.b. Cleveland	
No. 3 distillate	4.75c.
No. 4 distillate	4.00c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works High-Heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$38.00	$25.00 to $30.00
Maryland	38.00	25.00 to 30.00
New Jersey	$44.00 to 57.00	
Ohio	38.00	25.00 to 30.00
Kentucky	38.00	25.00 to 30.00
Missouri	35.00	30.00
Illinois	38.00	25.00 to 30.00
Ground fire clay, per ton	6.50	

Chrome Brick

	Per Net Ton
Standard size	$42.50

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$61.50
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50
Domestic, f.o.b. Chewelah, Wash.	20.90

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$40.40 to $41.40
4-in., del'd Chicago	43.40 to 44.40
6-in. and larger, del'd New York	$30.20
4-in., del'd New York	33.20
6-in. and larger, Birmingham	$32.00 to 33.00
4-in., Birmingham	$35.00 to $36.00

Class "A" and gas pipe, $3 extra.

Pig Iron Prices for All Districts

VALLEY

Per gross ton, f.o.b. Valley furnace:

Basic	$14.50
Bessemer	15.50
Gray forge	15.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.50
Low phos., copper free	25.00

Freight rate to Pittsburgh or Cleveland district, $1.89.

PITTSBURGH

Per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$15.00
No. 2 foundry	16.00
No. 3 foundry	15.50
Malleable	16.00
Bessemer	16.00

Freight rates to points in Pittsburgh district range from 69c. to $1.26.

CHICAGO

Per gross ton at Chicago furnace:

N'th'n No. 2 fdy.	$16.50
N'th'n No. 1 fdy.	17.00
Malleable, not over 2.25 sil.	16.50
High phosphorus	16.50
Lake Super. charcoal, sil. 1.50, by rail	23.17
S'th'n No. 2 fdy.	16.14
Low phos., sil. 1 to 2, copper free	$28.50 to 29.20
Silver, sil. 8 per cent	24.92
Bess. ferrosilicon, 14-15%	31.42

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., del'd St. Louis	18.80
Southern No. 2 fdy., del'd	$14.56 to 15.56
Northern malleable, deliv'd	18.80
Northern basic, deliv'd	18.80

Freight rates 83c. (average) Granite City to St. Louis; $2.30 from Chicago; $4.56 from Birmingham.

NEW YORK

Per gross ton, delivered New York district:

*Buffalo, No. 2, del'd east. N. J.	$17.91 to $18.41
East. Pa. No. 2 fdy.	17.02 to 17.52
East. Pa. No. 2X fdy.	17.52 to 18.02

Freight rates: $1.52 to $2.63 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy.	$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal	23.41

NEW ENGLAND

Per gross ton delivered to most New England points:

*Buffalo, sil. 1.75 to 2.25	$20.04
*Buffalo, sil. 2.25 to 2.75	20.04
*Ala., sil. 1.75 to 2.25	19.74
*Ala., sil. 2.25 to 2.75	20.24
†Ala., sil. 1.75 to 2.25	15.88
†Ala., sil. 2.25 to 2.75	16.28

Freight rates: $5.04 all rail from Buffalo; $9.75 all rail from Alabama and $5.88 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N'th'n No. 2 foundry	18.01
S'th'n Ohio silvery, 8 per cent	22.01

Freight rates, $2.02 from Ironton and Jackson, Ohio; $3.81 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

East. Pa. No. 2	$15.64 to $16.14
East. Pa. No. 2X	16.14 to 16.64
East. Pa. No. 1X	16.64 to 17.14
Basic (del'd east. Pa.)	16.25
Malleable	18.00 to 18.50
Stand. low phos. (f.o.b. east. Pa. furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	22.00 to 22.50
Va. No. 2 plain	22.04
Va. No. 2X	22.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 84c. to $1.79 from eastern Pennsylvania furnaces; $4.67 from Virginia furnaces.

CLEVELAND

Per gross ton at Cleveland furnace:

N'th'n No. 2 fdy. (local delivery)	$16.00
S'th'n fdy., sil. 1.75 to 2.25	16.14
Malleable (local delivery)	16.00
Ohio silvery, 8 per cent	23.12
Stand. low phos., Valley	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 55c. average local switching charge; $3.12 from Jackson, Ohio; $6.14 from Birmingham.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

CANADA

Per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	$23.00 to 23.50

Prices of Ores, Ferroalloys and Fluorspar

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, aver. 68% iron	9.00c.
Iron, basic or foundry, Swedish, average 65% iron	8.00c.
Iron, basic and foundry, Russian, aver. 63% iron (nom.)	9.00c.
Manganese, Caucasian, washed 52%	24.00c.
Manganese, African, Indian, 50-52%	23c. to 24c.
Manganese, Brazilian, 46 to 48%	22c. to 23c.
Tungsten, Chinese wolframite	$11.00 to $11.25
Tungsten, domestic scheelite	9.50 to 10.00

	Per Gross Ton
Chrome, 45% Cr_2O_3 crude, c.i.f. Atlantic seaboard	$18.00
Chrome, 48% Cr_2O_3, c.i.f. Atlantic seaboard	20.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	*$72.00 to $75.00
Foreign, 80%, Atlantic or Gulf port, duty paid	*72.00 to 75.00

*Minimum price quoted for lots of 2000 tons or more.

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21% ..... $26.00 to $27.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$77.50
50% (less carload)	85.00
75% (carloads)	126.00
75% (less carloads)	136.00
14% to 16% (f.o.b. Welland, Ont., in carloads)	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$22.00	13%	$24.50
11%	22.50	14%	26.50
12%	23.50	15%	28.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$19.00	11%	$21.50
7%	19.50	12%	22.50
8%	20.00	13%	23.50
9%	20.50	14%	25.50
10%	21.00	15%	27.50

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	$1.08
Ferrotungsten, less carloads	$1.15 to 1.25
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	10.00c.
Ferrochromium, 2% carbon	17.00c. to 17.50c.
Ferrochromium, 1% carbon	19.00c. to 20.00c.
Ferrochromium, 0.10% carbon	23.50c. to 25.00c.
Ferrochromium, 0.06% carbon	25.50c. to 27.00c.
Ferrovanadium, del., per lb. contained Va.	$3.05 to $3.30
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton	91.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50
Silico spiegel, per ton, f.o.b. furnace, car lots	42.50
Ton lots or less, per ton	47.50
Silico-manganese, gross ton, delivered: 2.50% carbon grade	105.00
1% carbon grade	115.00
Spot prices	$5 a ton higher

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5, Kentucky and Illinois mines, freight allowed, Pittsburgh basis	$20.31
No. 2 lump, 85-5, Kentucky and Illinois mines, freight allowed, Pittsburgh basis	22.31
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	17.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	32.00

Old Material Quotations

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$10.00 to	$10.50
No. 2 heavy melting steel	9.00 to	9.50
No. 2 railroad wrought	10.00 to	10.50
Scrap rails	10.00 to	10.50
Rails 3 ft. and under	12.00 to	12.50
Sheet bar crops, ordinary	11.00 to	11.50
Compressed sheet steel	9.75 to	10.25
Hand bundled sheet steel	9.00 to	9.50
Hvy. steel axle turnings	9.00 to	9.50
Machine shop turnings	6.50 to	7.00
Short shov. steel turnings	6.50 to	7.00
Short mixed borings and turnings	6.50 to	7.00
Cast iron borings	6.50 to	7.00
Cast iron carwheels	10.50 to	11.00
Heavy breakable cast	8.00 to	8.50
No. 1 cast	9.50 to	10.50
Railr. knuckles and couplers	10.50 to	11.50
Rail. coil and leaf springs	10.50 to	11.50
Rolled steel wheels	10.50 to	11.50
Low phos. billet crops	13.00 to	13.50
Low phos. sheet bar crops	12.50 to	13.00
Low phos. plate scrap	10.50 to	11.50
Low phos. punchings	10.50 to	11.50
Steel car axles	15.00 to	15.50

CHICAGO

Delivered Chicago district consumers:

Per Gross Ton

Heavy melting steel	$7.00 to	$7.25
Shoveling steel	7.00 to	7.25
Frogs, switches and guards	7.00 to	7.25
Hydraulic comp. sheets	5.50 to	6.00
Drop forge flashings	5.00 to	5.50
No. 1 busheling	5.00 to	5.50
Rolled carwheels	8.00 to	8.50
Railroad tires	9.00 to	9.50
Railroad leaf springs	8.50 to	9.00
Axle turnings	5.75 to	6.25
Steel couplers and knuckles	8.25 to	8.75
Coil springs	9.50 to	10.00
Axle turnings (elec. fur.)	6.00 to	6.50
Low phos. punchings	9.50 to	10.00
Low phos. plates, 12 in. and under	9.00 to	9.50
Cast iron borings	4.50 to	5.00
Short shoveling turnings	4.00 to	4.50
Machine shop turnings	4.00 to	4.50
Rerolling rails	10.50 to	11.00
Steel rails, less than 3 ft.	9.25 to	9.75
Steel rails, less than 2 ft.	10.00 to	10.50
Angle bars, steel	8.25 to	8.75
Cast iron carwheels	7.50 to	8.00
Railroad malleable	7.00 to	7.50
Agricultural malleable	7.00 to	7.50
*Relaying rails, 56 to 60 lb.	19.00 to	21.00
*Relay. rails, 65 lb. and up	22.00 to	27.00

Per Net Ton

Iron angle and splice bars	7.00 to	7.50
Iron arch bars, transoms	7.00 to	7.50
Iron car axles	13.00 to	14.00
Steel car axles	10.25 to	10.75
No. 1 railroad wrought	5.50 to	6.00
No. 2 railroad wrought	6.25 to	6.50
No. 1 busheling	4.75 to	5.25
No. 2 busheling	2.50 to	3.00
Locomotive tires, smooth	8.00 to	9.00
Pipes and flues	3.25 to	3.75
No. 1 machinery cast	7.50 to	8.00
Clean automobile cast	7.25 to	7.75
No. 1 railroad cast	6.00 to	6.50
No. 1 agricultural cast	6.25 to	6.75
Stove plate	5.75 to	6.25
Grate bars	5.50 to	6.00
Brake shoes	6.50 to	7.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$7.00 to	$7.75
No. 2 heavy melting steel	5.50 to	6.00
No. 1 railroad wrought	8.50 to	9.00
Bundled sheets		6.00
Hydraulic compressed, new	6.50 to	7.00
Hydraulic compressed, old	5.50 to	6.00
Machine shop turnings	4.00 to	4.50
Heavy axle turnings	6.00 to	6.50
Cast borings (nom.)		3.50
Heavy breakable cast		9.00
Stove plate (steel works)		7.00
No. 1 low phos. hvy	10.00 to	11.00
Couplers and knuckles	8.50 to	9.00
Rolled steel wheels	8.50 to	9.00
No. 1 blast furnace		3.50
Spec. iron and steel pipe		10.50
Shafting	13.50 to	14.00
Steel axles	14.50 to	15.00
No. 1 forge fire		6.00
Cast iron carwheels	10.00 to	10.50
No. 1 cast	10.00 to	10.50
Cast borings (chem.)	11.50 to	12.00
Steel rails for rolling		10.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$7.50 to	$8.00
No. 2 heavy melting steel	6.75 to	7.25
Compressed sheet steel	7.00 to	7.25
Light bundled sheet stampings	6.00 to	6.50
Drop forge flashings	6.00 to	6.25
Machine-shop turnings	4.25 to	4.50
Short shoveling turnings	5.75 to	6.25
No. 1 busheling	6.50 to	6.75
Steel axle turnings	7.50 to	8.00
Low phos., billet crops	14.00 to	14.50
Cast iron borings	5.75 to	6.00
Mixed borings and short turnings	5.75 to	6.00
No. 2 busheling	5.75 to	6.00
No. 1 cast	9.00 to	9.50
Railroad grate bars	6.00 to	6.50
Stove plate	6.00 to	6.50
Rails under 3 ft.	15.00 to	15.50
Rails for rolling	13.00 to	13.50
Railroad malleable	10.00 to	10.25

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel		$8.00
No. 2 heavy melting scrap		6.50
Scrap rails	$8.00 to	8.50
New hydraul. comp. sheets		6.50
Old hydraul. comp. sheets		5.50
Drop forge flashings		6.50
No. 1 busheling	6.50 to	7.00
Hvy. steel axle turnings	7.00 to	7.50
Machine shop turnings		5.00
Knuckles and couplers		10.00
Coil and leaf springs		10.00
Rolled steel wheels		10.00
Low phos. billet crops	12.00 to	12.50
Short shov. steel turnings	7.00 to	7.50
Short mixed borings and turnings	6.00 to	6.50
Cast iron borings	6.00 to	6.50
No. 2 busheling	3.50 to	4.00
Steel car axles	10.00 to	11.00
Iron axles	12.00 to	12.50
No. 1 machinery cast	9.50 to	10.00
Stove plate	8.25 to	8.75
Steel rails, 3 ft. and under	11.50 to	12.00
Cast iron carwheels	9.00 to	9.50
Industrial malleable	9.00 to	9.50
Railroad malleable	9.00 to	9.50
Chemical borings	8.50 to	9.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$7.50 to	$8.00
Scrap steel rails	8.00 to	8.50
Short shoveling turnings	3.50 to	4.00
Stove plates		6.00
Steel axles		12.00
Iron axles		12.00
No. 1 railroad wrought		6.00
Rails for rolling	9.00 to	9.50
No. 1 cast		9.00
Tramcar wheels	9.00 to	10.00
Cast iron borings, chem	10.00 to	11.00

ST. LOUIS

Dealers' buying prices per gross ton:

Selected heavy steel	$7.00 to	$7.50
No. 1 heavy melting	6.25 to	6.75
No. 2 heavy melting	6.00 to	6.50
No. 1 locomotive tires	7.50 to	8.00
Misc. stand-sec. rails	7.50 to	7.75
Railroad springs	8.50 to	9.00
Bundled sheets	4.25 to	4.75
No. 2 railroad wrought	6.25 to	6.75
No. 1 busheling	5.75 to	6.25
Cast iron borings and shoveling turnings	4.75 to	5.25
Iron rails	7.00 to	8.00
Rails for rolling	9.25 to	9.75
Machine shop turnings	3.00 to	3.50
Heavy turnings	5.50 to	6.00
Steel car axles	9.50 to	10.00
Iron car axles	14.00 to	14.50
Wrot. iron bars and trans.	5.00 to	5.50
No. 1 railroad wrought	4.75 to	5.25
Steel rails, less than 3 ft.	10.00 to	10.50
Steel angle bars	6.50 to	7.00
Cast iron carwheels	6.50 to	7.00
No. 1 machinery cast	8.00 to	8.50
Railroad malleable	5.00 to	5.50
No. 1 railroad cast	6.25 to	6.75
Stove plate	6.00 to	6.50
Relay. rails, 60 lb. and under	16.00 to	16.50
Relay. rails, 70 lb. and over	20.00 to	21.00
Agricult. malleable	5.00 to	5.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$4.25 to	$5.50
No. 2 heavy melting steel	3.75 to	4.50
Heavy melting steel (yard)	2.75 to	3.00
No. 1 hvy. breakable cast	5.00 to	5.50
Stove plate (steel works)	3.00 to	3.50
Machine shop turnings	1.00 to	1.50
Short shoveling turnings	1.00 to	1.50
Cast borings	1.00 to	1.50
No. 1 blast furnace	1.00 to	1.50
Steel car axles	10.00 to	10.50
Iron car axles (nom.)	14.00 to	14.50
Spec. iron and steel pipe		5.00
Forge fire		3.25
No. 1 railroad wrought	5.00 to	5.25
No. 1 yard wrought, long	4.00 to	4.25
Rails for rolling	6.00 to	6.25
Stove plate (foundry)	4.75 to	5.25
Malleable cast (railroad)	6.00 to	6.50
Cast borings (chemical)	8.00 to	8.50

Per gross ton, delivered local foundries:

No. 1 machinery cast	$8.50
No. 1 hvy. cast (cupola size)	7.50
No. 2 cast	6.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$4.00 to	$4.25
Scrap T rails	3.80 to	4.60
Machine shop turnings		1.05
Cast iron borings		1.05
Bundled skeleton, long		2.50
Forge flashings	3.00 to	3.50
Blast furnace scrap		1.05
Forge scrap	3.00 to	3.25
Shafting	9.50 to	10.00
Steel car axles	9.00 to	9.50
Wrought pipe	4.00 to	4.25
Rails for rolling	6.00 to	6.50
Cast iron borings, chemical	7.00 to	7.25

Per gross ton delivered consumers' yards:

Textile cast	$8.75 to	$9.25
No. 1 machinery cast	8.75 to	9.25
Stove plate	5.00 to	5.25
Railroad malleable	10.50 to	11.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$6.00 to	$7.00
Scrap rails for melting	8.00 to	8.50
Loose sheet clippings	2.25 to	2.75
Bundled sheets	4.75 to	5.25
Cast iron borings	2.75 to	3.25
Machine shop turnings	3.25 to	3.75
No. 1 busheling	4.25 to	4.75
No. 2 busheling	2.50 to	3.00
Rails for rolling	9.00 to	9.50
No. 1 locomotive tires	8.50 to	9.00
Short rails	11.75 to	12.25
Cast iron carwheels	8.25 to	8.75
No. 1 machinery cast	10.00 to	10.50
No. 1 railroad cast	8.75 to	9.25
Burnt cast	4.25 to	4.75
Stove plate	4.25 to	4.75
Agricultural malleable	8.00 to	8.50
Railroad malleable	9.00 to	9.50

DETROIT

Dealers' buying prices per gross ton:

Hvy. melting	$5.75 to	$6.25
Borings and short turnings	4.00 to	4.50
Long turnings	3.25 to	3.75
No. 1 machinery cast	8.50 to	9.00
Automotive cast	10.75 to	11.25
Hydraul. comp. sheets	5.75 to	6.25
Stove plate	4.50 to	5.00
New No. 1 busheling	4.75 to	5.25
Old No. 2 busheling	3.00 to	3.50
Sheet clippings	3.25 to	3.75
Flashings	4.75 to	5.25

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	12.50	10.00
Stove plate	10.00	8.00
Standard carwheels	11.00	8.50
Malleable	10.00	8.00

Warehouse Prices for Iron and Steel Products

CHICAGO

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforcing bars, billet steel	1.75c.
Rail steel reinforcement—	
For buildings	1.55c.
Road slabs, bridges, culverts	1.40c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.10c.
Flats and squares	3.60c.
Bands, 7/8 in. (in. Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 24)	3.55c.
Galv. sheets (No. 24)	4.10c.
Hot-rolled sheets (No. 10)	3.20c.
Spikes (7/8 in. and lighter)	3.45c.
Track bolts	4.30c.
Rivets, structural	3.75c.
Rivets, boiler	3.75c.
	Per Cent Off List
Machine bolts	73
Carriage bolts	73
Coach and lag screws	73
Hot-pressed nuts, sq., tap. or blank	73
Hot-pressed nuts, hex., tap. or blank	73
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

CLEVELAND

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 1.95c.
Cold-fin. rounds and hex	3.10c.
Cold-fin. flats and sq.	3.60c.
Hoops and bands, No. 12 to 7/8 in., inclusive	3.00c.
Hoops and bands, No. 13 and lighter	3.55c.
Cold-finished strip	*5.55c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.75c.
Hot-rolled sheets (No. 10)	3.00c.
Black ann'l'd wire, per 100 lb.	$2.75
No. 9 galv. wire, per 100 lb.	3.20
Com. wire nails, base per keg	2.35

*Net base, including boxing and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinforc. bars	3.00c.
Rail steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.20c.
Cold-fin. rounds and hex	3.50c.
Squares	4.00c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	4.25c.
Hot-rolled sheets (No. 10)	3.30c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, per 100 lb.	10.25
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$17.50
4-in.	36.00
Lap-welded steel boiler tubes, 2-in.	16.50
4-in.	34.50

BUFFALO

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	2.65c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.10c.
Bands	3.35c.
Hoops	3.90c.
Hot-rolled sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$2.45
Black wire, base per 100 lb.	3.20

NEW YORK

	Base per Lb.
Plates and struc. shapes	2.70c. to 3.10c.
Soft steel bars, small shapes	2.70c. to 3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Hot-rolled sheets (No. 10)	3.00c. to 3.25c.
Hot-rolled ann'l'd sheets (No. 24*)	3.60c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	5.00c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.60c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel, 1/2 x 1/2 in. and larger	3.40c.
Smooth finish, 1 to 2 1/2 x 1/4 in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.
Common wire nails, base, per keg	$2.60
	Per Cent Off List
Machine bolts, cut thread:	
3/4 x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
1/2 x 6 in. and smaller	65 to 65 and 10
3/4 x 20 in. and smaller	65 to 65 and 10
Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.35c.
Hot-rolled annealed sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Hot-rolled sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	3.85c.
Galv. corrug. sheets	4.40c.
Structural rivets	4.00c.
Boiler rivets	4.00c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	73
Carriage bolts	73
Lag screws	73
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	73
Less than 200 lb.	63
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	73
Less than 200 lb.	63

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates and struc. shapes, 1/4-in. and heavier	2.80c.	3.00c.	2.50c.
Soft steel bars	2.80c.	3.00c.	2.50c.
Reinforcing bars	2.80c.	2.80c.	3.00c.
Hot-rolled annealed sheets (No. 24)	3.90c.	3.90c.	4.00c.
Hot-rolled sheets (No. 10)	3.40c.	3.35c.	3.50c.
Galv. sheets (No. 24)	4.40c.	4.20c.	4.50c.
Struc. rivets, 1/2 in. and larger, less than 1000 lb.	5.00c.	5.00c.	5.50c.
Cold-finished steel bars and shafting:			
Rounds	5.25c.	5.00c.	4.25c.
Square and hexagon	6.25c.	6.50c.	5.50c.
Flats	6.75c.	6.50c.	6.50c.
Common wire nails, base per keg in less carloads	$2.75	$2.75	$2.75

Plates, shapes, bars, bands and hot-rolled sheets, No. 16 gage and heavier, subject to group differentials.

Cold-finished steel bars and shafting, subject to warehouse differentials for quantity.

All prices f.o.b. warehouse.

PITTSBURGH

	*Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	3.10c.
Squares and flats	3.60c.
Bands	2.95c.
Hoops	3.60c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.05c.
Galv. sheets (No. 24), 25 or more bundles	3.65c.
Hot-rolled sheets (No. 10)	3.15c. to 3.20c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	3.74c.
Spikes, large	2.50c.
Small	2.75c. to 2.90c.
Boat	3.00c.
Track bolts, all sizes, per 100 count,	70 and 10 per cent off list
Machine bolts, 100 count,	70 and 10 per cent off list
Carriage bolts, 100 count,	70 and 10 per cent off list
Nuts, all styles, 100 count,	73 and 10 per cent off list
Large rivets, base per 100 lb.	$3.00
Wire, black, soft ann'l'd, base per 100 lb.	2.30
Wire, galv. soft, base per 100 lb.	2.75
Common wire nails, per keg	2.25
Cement coated nails, per keg	2.25

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

PHILADELPHIA

	Base per Lb.
Plates, 1/4-in. and heavier	2.45c.
Structural shapes	2.45c.
Soft steel bars, small shapes, iron bars (except bands)	2.45c.
Reinforc. steel bars, sq., twisted and deform	2.30c.
Cold-fin. steel, rounds and hex.	3.30c.
Cold-fin. steel, sq. and flats	3.80c.
Steel hoops	3.00c.
Steel bands, No. 12 to 7/8-in., inclu.	2.75c.
Spring steel	5.00c.
Hot-rolled annealed sheets (No. 24)	3.55c.
Galvanized sheets (No. 24)	3.75c.
Hot-rolled and annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, 1/4 in.	5.00c.
Swedish iron bars	6.60c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

BOSTON

	Base per Lb.
Plates	*3.35c.
Structural shapes	*3.35c.
Soft steel bars, small shapes	*3.25c.
Reinforcing bars	3.10c. to 3.25c.
Iron bars—	
Refined	3.25c.
Best refined	4.60c.
Spring steel, open-hearth	5.00c.
Tire steel	4.50c. to 4.75c.
Bands	*3.75c. to 4.25c.
Hoop steel	4.90c. to 5.40c.
Cold-rolled steel—	
Rounds and hex.	3.50c. to 5.50c.
Squares and flats	4.00c. to 6.00c.
Rivets, structural or boiler	4.80c.
	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag screws	70
Hot-pressed nuts	40 and 10
Cold-punched nuts	40 and 10
Stove bolts	70 and 10

*Base price (250 to 999 lb.); less than 250 lb., add 50c. per 100 lb.; 1000 to 7999 lb., deduct 15c.; 8000 to 14,999 lb., deduct 25c.; 15,000 lb. and larger lots, deduct 35c.

Copper Offered at 6c., a New Low Price, by Small Producers; Tin Steady

NEW YORK, Feb. 9.—Although small producers are offering electrolytic copper at a new low price of 6c. a lb., delivered Connecticut Valley, no sales at that level are reported. The leading interests are offering electrolytic copper at 6.25c. to 6.50c., although, in the absence of buying, these quotations are virtually nominal. With the price situation still irregular and with fabricators well covered for their early requirements, immediate prospects for improved demand are not favorable.

The price of Copper Exporters, Inc., is unchanged at 6.87½c. a lb., delivered, c.i.f. usual European ports. With the wide spread existing between foreign and domestic prices, demand from abroad is apathetic. Current sales are small, only 5500 tons having been sold so far in February for export shipment. American copper interests are particularly concerned at this time in the outcome of the tariff discussion to take place this week in the British Parliament.

Lake copper is nominal at 6.62½c., delivered, with practically no demand.

Lead

Buying in the past week was restricted to small lots for immediate shipment. With about 30 per cent of February requirements still to be purchased, few consumers have covered for their March needs. Prices are firm at 3.75c., New York, and 3.55c., St. Louis.

Tin

Sales in the past week were in small volume. Prices continue to be fairly steady, with today's quotation 21.75c. a lb. The London market today is £138 5s. a ton for spot standard, £141 for future standard and £141 2s. 6d. for spot Straits. The Far East tin market is closed today, owing to the Chinese New Year. Warehouse stocks of tin in the United Kingdom increased 128 tons in the past week and now stand at 32,581 tons.

Zinc

Current transactions involve mostly forward deliveries, in some cases extending through June. The price of Prime Western zinc reached a record low level at the close of last week, when the East St. Louis quotation sagged to 2.80c. An increase of $1 a ton, effective yesterday, on zinc concentrates, sent the price up to 2.85c., East St. Louis, and 3.22c., New York. Unfilled orders on producers' books at the close of January were 24,232 tons, an increase of 5959 tons over the unfilled orders at the end of December, when the total was 18,273 tons.

Antimony

The market is virtually dormant. The keen interest occasioned last week by the crisis in the Far East has subsided, and consumer and speculative buying has disappeared. The price for prompt shipment is 6.75c. a lb., duty paid, New York. Futures are nominal at 4.50c., c.i.f. New York.

Reinforcing Steel

Awards 2800 Tons—New Projects 1125 Tons

Somerville, Mass., 150 tons, First National Stores plant addition, to Joseph T. Ryerson & Son, Inc.

New York, 525 tons, sewer, Tenth Avenue and Forty-ninth Street, to National Bridge Works; Remo Engineering Corpn., general contractor.

New York, 445 tons, vault for First National Bank; Rivet-Grip Co., fabricator; York Safe & Lock Co., erector.

Columbus, Ohio, 200 tons, Olentancy Sewer, to Concrete Steel Co.

Cincinnati, 675 tons, mail handling building, for Cincinnati Union Terminals Co., to Pollak Steel Co.

White Haven, Tenn., 110 tons, school, to Laclede Steel Co.

Port Angelus, Wash., 100 tons, post office, to Pacific Coast Steel Co.

Cle Elum, Wash., 600 tons, Federal irrigation dam for Yakima project, to Sheffield Steel Co.; 1100 tons additional to be awarded later.

NEW REINFORCING BAR PROJECTS

Darby, Pa., 175 tons, Mercy Hospital; John McShain, Philadelphia, general contractor.

Chicago, 300 tons, revival of an apartment building project on Lake Shore Drive.

Los Angeles, 150 tons, harbor pier sheds 144-146.

Los Angeles County, 100 tons, San Gabriel dam.

San Diego, 100 tons, building for private clinic.

Los Angeles, 100 tons, Chrysler building, first unit.

Fairbanks, Alaska, tonnage not stated, Government building.

Davenport, Iowa, 100 tons, post office.

Terre Haute, Ind., 100 tons, post office.

The Week's Prices. Cents Per Pound for Early Delivery

	Feb. 3	Feb. 4	Feb. 5	Feb. 6	Feb. 8	Feb. 9
Lake copper, New York	6.87½	6.87½	6.62½	6.62½	6.62½	6.62½
Electrolytic copper, N. Y.*	6.50	6.50	6.25	6.25	6.25	6.25
Straits tin, spot, N. Y.	21.85	21.87½	21.87½	....	21.75	21.75
Zinc, East St. Louis	2.82½	2.80	2.80	2.80	2.85	2.85
Zinc, New York	3.19½	3.17	3.17	3.17	3.22	3.22
Lead, St. Louis	3.55	3.55	3.55	3.55	3.55	3.55
Lead, New York	3.75	3.75	3.75	3.75	3.75	3.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 6.75c. a lb., New York.
Brass ingots, 85-5-5-5, 6.75c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	24.00c. to 25.00c.
Tin, bar	26.00c. to 28.00c.
Copper, Lake	8.50c. to 9.50c.
Copper, electrolytic	8.25c. to 9.25c.
Copper, casting	8.00c. to 9.00c.
*Copper sheets, hot-rolled	15.87½c.
*High brass sheets	12.87½c.
*Seamless brass tubes	16.12½c.
*Seamless copper tubes	15.37½c.
*Brass rods	10.62½c.
*Brazed brass tubes	22.00c.
Zinc, slab	4.75c. to 5.25c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	4.50c. to 5.00c.
Lead, bar	6.25c. to 7.25c.
Lead sheets	8.00c.
Antimony, Asiatic	9.00c. to 10.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent	17.00c. to 18.00c.
Solder, ½ and ½	15.25c. to 16.25c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

Metals from Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	25.75c.
Tin, bar	27.75c.
Copper, Lake	7.87½c.
Copper, electrolytic	7.87½c.
Copper, casting	7.50c.
Zinc, slab	4.25c. to 4.50c.
Lead, American pig	4.30c. to 4.50c.
Lead, bar	7.75c.
Antimony, Asiatic	10.00c.
Babbitt metal, medium grade	15.00c.
Babbitt metal, high grade	29.25c.
Solder, ½ and ½	17.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.25c.	6.00c.
Copper, hvy. and wire	5.00c.	5.75c.
Copper, light and bottoms	4.00c.	4.75c.
Brass, heavy	2.50c.	3.25c.
Brass, light	2.00c.	2.75c.
Hvy. machine composition	4.00c.	4.75c.
No. 1 yel. brass turnings	3.00c.	3.50c.
No. 1 red brass or compos. turnings	3.50c.	4.25c.
Lead, heavy	2.50c.	3.00c.
Zinc	1.25c.	1.75c.
Cast aluminum	3.25c.	5.00c.
Sheet aluminum	8.50c.	10.50c.

Machine Tool Trade Is Still Dull

Aside from Recent Automobile Orders, Plants Have Very Little Work and Few Prospects

ALTHOUGH a few machine tool plants are busily engaged on recent automobile orders, the general run of machine tool business continues to be exceedingly light. There is very little prospect of an important pick-up this month.

Inquiries are more numerous, but they are mostly for single tools. In some instances it appears that orders are likely to be placed soon. However, the volume of such business, if it all should materialize, would not be enough to improve the situation to any marked extent.

A considerable amount of replacement business is in prospect, but will not develop until there is a major improvement in the demands for the many products for which metal-working machinery is used.

As a rule, companies which have in contemplation such replacement programs are not willing to replace one idle tool with another tool which might also remain idle under present conditions.

New York

A few inquiries for single tools have come into the market which bear evidence of being translated into orders soon. There is no general revival of buying interest, however, and the market remains dull. The New York, New Haven & Hartford Railroad has taken new prices on several machines for which it inquired some months ago.

Pittsburgh

Orders for machine tools continue to show moderate improvement and sentiment among dealers is considerably better than a month ago. A fair amount of miscellaneous inquiry is coming out. Several buyers are figuring on a number of tools each and are showing a willingness to accept recommendations to install new equipment if costs can be reduced.

The Pittsburgh Equitable Meter Co., Pittsburgh, is still in the market for tools and equipment, although some of its business has been closed. Railroad inquiry is still lacking, but some carriers are more receptive to sales effort than formerly.

Chicago

Business so far in February has not much more than held the pace set in the preceding month. However, dealers are finding some improvement in demand from smaller manufacturers in outlying districts. Among recent orders is $10,000 worth of tools for the Westinghouse elevator works, Chicago. Jobbing shops are urgently in need of orders. In many cases, when work reaches them, they are forced to work overtime because of delivery limitations imposed by buyers.

Milwaukee

Automotive business of relative importance has been developed in the past two or three weeks. Inquiry from this source also has improved materially. A local builder of high production tools reports an order for close to $100,000 worth of continuous milling machines from a large automobile plant. The same interest is completing delivery of six new types of multiple-spindle drills to the Ford Motor Co. for balancing crankshafts. Tractor manufacturers also are more interested in equipment than has been evident for at least six to eight months. Viewing local tool plants as a whole, the situation is distinctly better.

Cleveland

Very little machinery business was placed during the week and inquiry was equally light. No improvement is looked for this month over January. A fair amount of business in replacement equipment is in prospect, but this is being held back by limited plant operations. Shops as a rule will not buy tools to replace others that are at present idle. Sales include a die casting machine purchased by a northern Ohio foundry.

Cincinnati

Machine tool business in this district continues to be light, although weekly sales indicate slight widening of interest. New business included single units for various types of machines, but reflected a recession in demand for light lathes. One manufacturer of lathes, who closed his plant for 10 days, has resumed operation.

◀ NEW YORK ▶

Ralph Stark, Inc., Long Island City, care of Samuel Adelman, 110 William Street, New York, recently organized by Ralph Stark and associates, leased building, 100 x 100 ft., at Long Island City, for new mechanical and welding works.

F. W. Steere, Bar Building, White Plains, N. Y., recently organized by F. W. Steere and associates, plans new factory at Detroit for manufacture of autogiro windmill aircraft, including parts and assembling department. License for production secured from Autogiro Co. of America, Inc., Land Title Building, Philadelphia. Mr. Steere was formerly president of Steere Engineering Co., Detroit.

Signal Supply Officer, Army Base, Brooklyn, asks bids until Feb. 23 for equipment for modification of 150 motor-generators (Circular 76); until Feb. 24 for quantity of manhole tops) (Circular 81).

Department of Hospitals, Municipal Building, New York, filed plans for four-story equipment storage and distributing building, 84 x 118 ft., and two-story fertilizer plant, 82 x 193 ft., on Ward's Island, to cost $250,000 and $300,000, respectively, with equipment. Sloan & Robertson, 420 Lexington Avenue, architects.

Jacob Adler, 785 Humboldt Street, Brooklyn, has plans for rebuilding portion of metal works recently destroyed by fire. Laspia & Samenfeld, 217 Havemeyer Street, architects.

Skidmore Iron Works, Inc., Brooklyn, care of Louis A. Eisenberg, 277 Broadway, New York, has been organized to operate a general iron and steel works.

Boulevard Supply Co., 547 Southern Boulevard, Bronx, New York, plumbing equipment and supplies, leased three-story building at 192 Southern Boulevard for equipment storage and distributing plant, pipe shop, etc.

Bureau of Supplies and Accounts, Navy Department, Washington, and Naval Supply Depot, Brooklyn, asks bids until Feb. 16 for one 35-ton hydraulic press (Schedule 7388), one motor-driven gap splitting and squaring shearing machine (Schedule 7397); until Feb. 23 for one gasoline engine-driven arc welding outfit (Schedule 7419) for Brooklyn Navy Yard.

School District No. 11, Oceanside, near Rockville Center, L. I., contemplates manual training department in three-story addition to high school. Cost over $350,000. F. P. Wiedersinn, 240 Rockaway Avenue, Valley Stream, L. I., architect.

Westchester Lighting Co., Mount Vernon, N. Y., has superstructure under way on two-story equipment service, repair and storage building at Peekskill, N. Y. Edward J. Walsh, Peekskill, general contractor. Cost about $70,000 with equipment.

Russell G. Cory, 30 Church Street, New York, engineer, has plans for four-story automobile service, repair and garage building, 100 x 125 ft., and begins work in about 60 days. Cost over $140,000 with equipment.

Bamberger Broadcasting Service, 147 Market Street, Newark, N. J., operating station WOR, has applied for permission to build

SIMONDS

RED STREAK HIGH SPEED STEEL HACK SAW BLADES

FACTORIES which have used RED STREAK High Speed Steel Hack Saw Blades are so thoroughly satisfied with their performance that they insist on these blades regardless of all others, including substitutes which are being offered under various trade names. You can get cheaper blades, but in the long run they will cost you more.

Unsolicited reports from users throughout the country give records made in actual performance which are conclusive evidence that no substitute metal comes anywhere near equaling RED STREAK High Speed Steel for heavy duty hack saw service. Therefore it will pay you to use these blades—trade marked with the brilliant red back edge.

The Simonds higher content Tungsten blade is the other leading, most popular hack saw for hand use. Its quality is identified by the brilliant RED END.

Order from Your Dealer

Simonds Saw and Steel Co.

"The Saw Makers"

Established 1832 Fitchburg, Mass.

50,000-watt broadcasting station at or near Far Hills, N. J., with steel towers, power station and other facilities. Cost over $100,000.

Department of Public Affairs, City Hall, Newark, Jerome T. Congleton, mayor, director, asks bids until Feb. 15 for posts for street signs.

Little Falls Laundry Co., 101 East Main Street, Little Falls, N. J., has revised plans for two-story and basement automobile service, repair and garage building, 140 x 280 ft., in conjunction with other expansion. Cost over $100,000. Fred W. Wentworth, 140 Market Street, Paterson, N. J., architect.

DeChellis Corpn., Newark, N. J., care of Charles C. Giffoniello, 31 Clinton Street, has been organized by Costanzo DeChellis and associates to manufacture tools and mechanical equipment.

Mass Production Corpn., Jersey City, N. J., recently organized to manufacture portable typewriters, parts, etc., leased space in factory at Baldwin Avenue and High Street for parts production and assembling.

PHILADELPHIA

Keebler-Weyl Baking Co., 260 North Twenty-second Street, Philadelphia, will soon take bids for first unit of new plant, four stories and basement, with traveling ovens, power equipment, conveying machinery, etc. Cost about $900,000 with equipment. Later company will build second unit, approximating $700,000 with machinery. Clarence E. Wunder, Architects' Building, is architect.

United Gas Improvement Co., 1401 Arch Street, Philadelphia, operating Philadelphia Gas Works Co., has engaged Ford, Bacon & Davis., Inc., 39 Broadway, New York, consulting engineer, to make survey of local system with view to utilizing natural gas, covering pressure and mixing stations, pipe lines, etc., in conjunction with artificial gas.

Keystone Metal Works, Inc., Philadelphia, has been organized by I. G. Dether, 1907 North Mascher Street, and Wolfgang Adam, 336 Master Street, to manufacture metal stampings, dies and other products. Company will take over and expand a local plant.

United Butchers' Abattoir, Inc., Philadelphia, care of Stadler Engineering Co., 140 Liberty Street, New York, consulting engineer, let general contract to Barclay White & Co., 22 North Thirty-sixth Street, for two-story plant, 83 x 149 ft. Cost over $65,000 with conveying and other equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, and Supply Officer, Navy Yard, Philadelphia, asks bids until Feb. 16 for ferrule mounting resistors (Schedule 7248), one motor-driven bandsaw (Schedule 7394), one motor-driven portable factory type vacuum cleaner (Schedule 7396); until Feb. 23 for quantity aneroid-type aircraft oxygen regulators (Schedule 7387), and 300 aircraft fuel quantity gages (Schedule 7420) for Philadelphia Navy Yard.

Segal & Rothman, Inc., Philadelphia, has been organized by Jacob K. Rothman, 21 North Robinson Street, and associates, to take over and expand company of same name at 144 North Third Street, manufacturer of electrical transmission equipment, parts, etc.

Bell Telephone Co. of Pennsylvania, 1835 Arch Street, Philadelphia, is arranging appropriation of $4,675,000 for new construction in central Pennsylvania. Of this fund, about $1,000,000 will be expended in Harrisburg district, new cable line will be built from Harrisburg to Reading, new central automatic station will be built at Steelton, cost $150,000.

NEW ENGLAND

East Coast Ship & Yacht Corpn., New London, Conn., operating at former shipyard of Noank Shipyard, Inc., is arranging for two or more one-story shop units and installation of mechanical-handling equipment, including electric hoists, turntables, etc. Harry F. Morse, president, in charge.

City of Boston, Hospital Department, 818 Harrison Avenue, has plans for extensions and improvements in power plant, with installation of additional equipment. Cost about $240,000. James H. Ritchie & Associates, 100 Arlington Street, architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 16 for quantity of ball bearings and outer races for ball bearings (Schedule 7377) for Newport Navy Yard; until Feb. 23 for 1200 condensers for Portsmouth Navy Yard (Schedule 7390).

Bristol Co., Waterbury, Conn., manufacturer of measuring and recording instruments, has plans for two-story addition at Platts Mills. Cost over $50,000 with equipment. F. A. Webster, 51 West Main Street, architect.

Airnoil Burners, Inc., Hartford, Conn., has been organized by H. F. Lovell, 312 Main Street, Glastonbury, Conn., and William Earle, 1476 Main Street, Hartford, to manufacture oil burners and oil-burning equipment.

Fred D. Corey, Electric Building, Buffalo, representing bondholders' protective committee, has acquired plant and property of Locomobile Co. of America, Inc., Bridgeport, Conn., at foreclosure sale for $200,000. Purchasing interests contemplate converting property for industrial marine shipping base and plant.

Board of Selectmen, West Boylston, Mass., is considering erection of municipal electric lighting plant. Cost over $60,000 with equipment.

Viking Flying Boat Co., 80 Shelton Avenue, New Haven, Conn., filed plans for one-story hangar at marine airport, 85 x 100 ft., with repair shop, 25 x 75 ft. Administration building will also be erected. Cost over $75,000 with equipment.

First National Stores, Inc., Somerville, Mass., food products, let general contract to Turner Construction Co., 137 Newbury Street, for one-story addition. Cost over $100,000 with mechanical-handling and other equipment. Monks & Johnson, 99 Chauncy Street, Boston, architects and engineers.

Frederick F. Boyce Machine Co. and Smith & Langmaid Co., machine shop, jointly occupying building on Central Wharf, plan rebuilding plants recently damaged by fire. Loss about $40,000 with equipment.

SOUTH ATLANTIC

Ford Motor Co., Dearborn, Mich., asks bids until Feb. 20 for one-story factory branch, distributing and service plant, 200 x 400 ft., at Alexandria, Va., where site was recently purchased. Part of plant will be used for enameling department. Concrete loading dock will be built. Cost over $100,000 with equipment. Albert Kahn, Inc., Detroit, is architect and engineer.

United States Coast Guard Headquarters, Washington, asks bids until Feb. 15 for two full crawler type tractors.

Continental Oil Co., Keyser Building, Baltimore, will carry out expansion and improvements at oil refinery for gasoline production, increasing capacity by 4000 bbl. daily. Contract let to Alco Products, Inc., Dunkirk, N. Y., for gasoline treating plant unit.

Virginia Electric & Power Co., Richmond, Va., has approved appropriation of $1,629,000 for new construction, extensions and improvements in power plants and system, including distributing lines. About $175,000 of fund will be used for gas division.

Purchase Section, Bureau of Standards, Washington, asks bids until Feb. 25 for two 5-ton cranes for national hydraulic laboratory.

Allegheny Ore & Iron Co., Buena Vista, Va., contemplates installation of additional equipment, including jar stone crusher, with screen, etc., capacity about 5 tons an hour.

Quartermaster, Marine Corps, Washington, asks bids until Feb. 17 for steel storage bins, with dividers, extra shelves, metal counters, etc. (Schedule 529); until Feb. 15 for 100 cast iron covers, outlet boxes and other electrical equipment (Schedule 531).

Constructing Quartermaster, Langley Field, Va., asks bids until Feb. 16 for automobile service, repair and garage building. Cost about $50,000, exclusive of equipment; until Feb. 29 for transformer house, underground electrical distributing system, etc.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Feb. 16 for one back-geared precision screw-cutting lathe (Schedule 7408) for Washington yard; bar brass, naval brass, etc. (Schedule 7393); for Hampton Roads, Va., and other yards; one 40-in. wood-working angle bandsaw (Schedule 7423), 50,000 ft. lighting and power cable, quantity twisted pair cable, etc. (Schedule 7416) for Norfolk Navy Yard; two combined auxiliary air and circulating pumps, and spare parts (Schedule 7369) for Charleston and Mare Island yards; metallic ladder treads and aluminum alloy (Schedule 7370) for Brooklyn and Mare Island yards; machine and wood screws (Schedule 7342) for Eastern and Western yards; until Feb. 23 for quantity of boat rivets, brass washers, aluminum alloy rivets (Schedule 7379) for Eastern and Western yards; airplane landing wheels (Schedule 7392) for Philadelphia and Hampton Roads yards.

BUFFALO

New York Central Electric Corpn., 80 East Avenue, Rochester, N. Y., plans installation of power and distributing system at Throupsbury, N. Y., and vicinity.

Delco Appliance Corpn., 391 Lyell Avenue, Rochester, subsidiary of General Motors Corpn., has developed new isolated electric lighting plant for rural service, with capacity of 600 watts, and will carry out commercial production of new unit.

E. R. Seifert, Inc., Syracuse, N. Y., has been organized by E. R. Seifert, 315 East Washington Street, mechanical engineer, and associates, to manufacture machinery and parts, mechanical devices, etc.

New York State Electric & Gas Co., 22 Central Avenue, Ithaca, N. Y., contemplates erection of new power station at Delaware, N. Y. Cost over $85,000 with equipment.

H. A. Ruff, Inc., Buffalo, has been organized by Herbert A. Ruff, 39 Olcott Street, Cheektowaga, Buffalo, and associates, to manufacture sheet metal products.

MILWAUKEE

Davis & Thompson Co., 6619 West Mitchell Street, Milwaukee, has booked an order from a large automotive interest, identity of which is not disclosed, for $100,000 worth of especially designed milling machines. Delivery is being completed to Ford Motor Co. of six special multiple drilling units for balancing crankshafts. International Harvester Co. has purchased special miller for Farmall tractor plant. Orders also being filled for special milling and drilling units for production of telephone telegraph and radio parts, and for carbureter, ignition and refrigerator work.

X-Ray Shoe Fitter, Inc., 234 East Reservoir Avenue, Milwaukee, manufacturer of electrical equipment for shoe stores, has placed general contract with R. W. Dwyer, Inc., 1226 West Wisconsin Avenue, for first unit of new factory, 60 x 80 and 25 x 60 ft. Cost about $40,000.

Common Council, Portage, Wis., has engaged Pearse, Greeley & Hansen, 6 North Michigan Avenue, Chicago, to design new sewage disposal plant to cost $50,000. H. V. Tennant is city engineer.

Northern Corrugating Co., Pearl and Bridge Streets, Green Bay, Wis., has changed its corporate title to Norcor Mfg. Co. Originally founded to manufacture sheet steel building materials, company is now engaged principally in making steel folding chairs and tables, steel auditorium seating, folding steel armchairs, etc.

CHICAGO

Gunite Foundries Corpn., Rockford, Ill., has been organized to take over Rockford Northwestern Malleable Corpn. and Gunite Corpn., both of Rockford, manufacturers of brake drums, connecting rods, wrenches, etc. Consolidated company will continue in same line of output and increase number of products. Duncan P. Forbes is president and general manager.

Atlantic Elevator, 1549 Cherry Street, Chicago, plans rebuilding portion of grain elevator recently destroyed by fire. Loss about $100,000 with equipment.

City Council, Springfield, Minn., is considering addition to municipal electric light and power plant, including installation of equipment. A. C. Mueller, city clerk.

United States Engineer Office, Duluth, Minn., asks bids until Feb. 17 for quantity of wire rope (Circular 40).

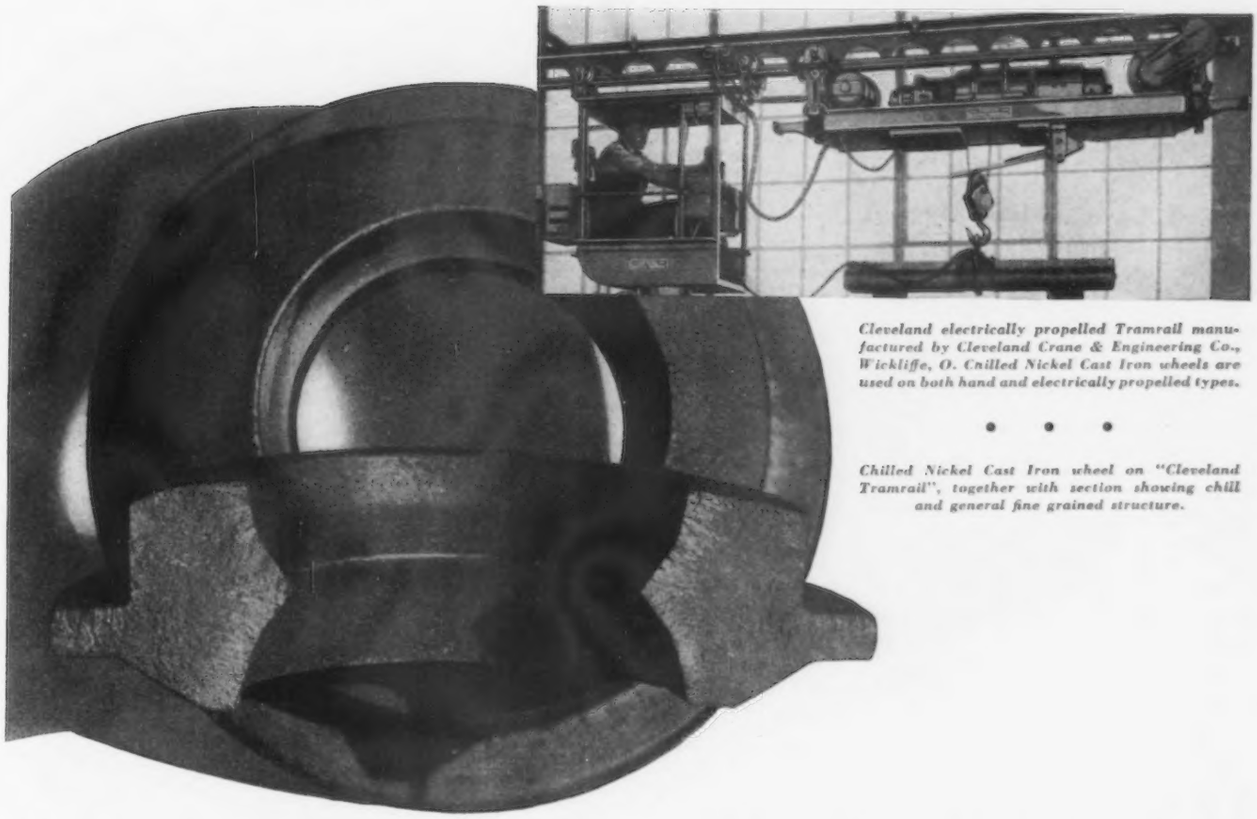
City Council, Loveland, Colo., plans one-story municipal equipment storage and distributing plant, 62 x 125 ft., with reconditioning department. O. W. Vandapool, city clerk, in charge.

Superior Refining Machines, Inc., 21 East Van Buren Street, Chicago, has been organized by D. H. and H. R. Palmer to manufacture machinery and parts.

Continental Airways, Inc., 5032 West Sixty-third Street, Chicago, plans rebuilding hangar at municipal airport, recently destroyed by fire. Loss about $100,000 including equipment.

City Council, Villisca, Iowa, plans municipal electric light and power plant. Cost about $125,000 with equipment. W. E. Schwob, Iowa City, Iowa, consulting engineer.

Red River Valley Power Co., Grand Forks, N. D., subsidiary of Northern States Power Co., 15 South Fifth Street, Minneapolis, has plans for one-story machine shop, filter plant



Cleveland electrically propelled Tramrail manufactured by Cleveland Crane & Engineering Co., Wickliffe, O. Chilled Nickel Cast Iron wheels are used on both hand and electrically propelled types.

• • •

Chilled Nickel Cast Iron wheel on "Cleveland Tramrail", together with section showing chill and general fine grained structure.

CLEVELAND tramrail wheels travel 10,000 MILES *without measurable wear!*

● **"Our wheels have operated a distance of 10,000 miles without lubrication and still do not show measurable wear."**

That's what the Cleveland Crane & Engineering Co., for more than 32 years leading manufacturers of material handling equipment, say about the Nickel Cast Iron wheels used on their Tramrails. These chilled Nickel Cast Iron wheels contain approximately 0.70% Nickel and 0.35% chromium and must be cast to a tolerance of 0.004". Besides affording extremely hard wearing properties, this Nickel Cast Iron produces a tougher structure in the chilled area. It also has finer grain and, therefore, increased strength behind the chill.

Scientifically alloyed Nickel Cast Iron meets the exacting requirements of equipment manufacturers who demand materials that "perform better longer." Specify Nickel in your next order for chilled cast iron.

Our casting specialists will gladly discuss your problems with you

Nickel CAST IRON
A BETTER MATERIAL FOR MODERN NEEDS

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.
Miners, refiners and rollers of Nickel. Sole producers of Monel Metal

DISTRIBUTORS

United States

ATLANTA.....J. M. Tull Rubber & Supply Co.
BUFFALO.....Whitehead Metal Products Co. of N. Y., Inc.
CAMBRIDGE..Whitehead Metal Products Co. of N. Y., Inc.
CHICAGO.....Steel Sales Corp.
CINCINNATI.....Williams and Co., Inc.
CLEVELAND.....Williams and Co., Inc.
DENVER.....Hendrie & Bolthoff Mfg. & Supply Co.
DETROIT.....Steel Sales Corp.
KANSAS CITY.....Steel Sales Corp.
LOS ANGELES.....Pacific Metals Co., Ltd.
MILWAUKEE.....Steel Sales Corp.
MINNEAPOLIS.....Steel Sales Corp.
NEWARK, Whitehead Metal Products Co. of N. Y., Inc.
NEW ORLEANS.....Equitable Equipment Co., Inc.
NEW YORK, Whitehead Metal Products Co. of N. Y., Inc.
PHILADELPHIA, Whitehead Metal Products Co. of N. Y., Inc.
PITTSBURGH.....Williams and Co., Inc.
ST. LOUIS.....Steel Sales Corp.
SAN FRANCISCO.....Pacific Metals Co., Ltd.
SEATTLE.....Eagle Brass Foundry Co.

Canada

MONTREAL.....Robert W. Bartram, Ltd.
TORONTO.....Peckover's Limited
VANCOUVER, B. C.....Wilkinson Co., Ltd.

and switchboard gallery at power plant, 22 x 50 ft., and 15 x 66 ft.

American Smelting & Refining Co., New York, is resuming operations at plant at Helena, Mont., after shut-down of about four weeks. Employment will be given to 165 men.

Malleable Iron Co. will close its Decatur, Ill., plant and much of its machinery and equipment will be transferred to Danville, Ill., and consolidated with Allith-Prouty Co.

CINCINNATI

Constructing Quartermaster, Wright Field, Dayton, Ohio, asks bids until March 2 for erection of disassembly hangar A, and final assembly hangar with annex for shop, oil reclamation and administration buildings at Patterson Field. Cost about $200,000.

Board of Hamilton County Commissioners, County Courthouse, Cincinnati, asked bids on general contract for addition to road equipment repair plant at Woodlawn, Springfield Township.

United States Engineer Office, Memphis, Tenn., asks bids until Feb. 16 for one surface condenser unit with combined air and circulating pump, one feed water heater, and one evaporating condenser (Circular 500); until Feb. 17 for one walking tail tower complete (Circular 459).

Phoenix Hotel Co., Lexington, Ky., has approved plans for power house, 44 x 45 ft. Cost about $50,000 with equipment. General contract let to F. A. Justice Co., Lexington.

Tavern Rock Sand Co., 965 Wall Street, Toledo, Ohio, affiliated with Owens-Illinois Glass Co., same address, has acquired more than 250 acres of glass sand properties near Enterprise, Ky., and plans glass-sand mining, storage and distributing plant, also large crushing plant. Cost over $200,000 with machinery.

United States Engineer Office, Cincinnati, asks bids until Feb. 15 for one turbo-generator unit, capacity 1500 watts (Circular 52).

Contracting Officer, Wright Field, Dayton, Ohio, asks bids until Feb. 23 for quantity of smoke screen tube assemblies, smoke screen apparatus, etc. (Circular 382); until Feb. 24 for clevis bolts, aircraft bolts, clevis fasteners, nuts, flathead pins, turnbuckle assemblies (Circular 280), 300 internal and 450 streamline tie rods (Circular 281).

CLEVELAND

Goodyear Tire & Rubber Co., Akron, Ohio, let general contract to Hunkin-Conkey Construction Co., Cleveland, for two-story factory branch, storage and distributing plant at Cleveland. Cost about $100,000 with equipment. W. D. LaDue, manager, architectural engineering and service division, Akron, in charge.

Foundry Equipment Co., 1831 Columbus Road, Cleveland, acquired plant and business of McCann-Harrison Co., 16606 Waterloo Road, manufacturer of heat-treating and annealing furnaces, parts, etc. Purchasing company will remove plant to Columbus Road works where operations will be expanded.

Willoughby Rural School District, Willoughby, Ohio, will install manual training equipment in one-story and basement addition to Longfellow school. Bids have been asked on general contract. Cost about $100,000. Fulton & Taylor, 8120 Euclid Avenue, Cleveland, architects; Mayer & Valentine, Plymouth Building, Cleveland, mechanical engineers.

Doehler Die Casting Co., Smead Avenue, Toledo, Ohio, is increasing operations and has added about 350 workers during past few weeks. Plant is now running on 75 per cent capacity schedule.

Marion Steam Shovel Co., Marion, Ohio, has secured contract from Clemens Coal Co., Pittsburgh, Kan., for one of largest electric-operated excavating machines ever built, power shovel type.

Moser Tool & Die Co., Inc., Toledo, Ohio, care of Marshall, Melhorn, Marlar & Martin, Spitzer Building, representatives, has been organized by Milton Knight, Toledo, and associates, to manufacture tools, dies and kindred products.

PITTSBURGH

H. H. Robertson Co., Grant Building, Pittsburgh, manufacturer of metal roofing and siding, asbestos protected metal products, etc., contemplates addition to plant at Ambridge, Pa., for manufacturer of steel flooring.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 16 for one motor-driven engine lathe (Schedule 7399), and one impact testing machine (Schedule 7386) for Munhall, Pa., yard.

Electric Mine Door Co., Pittsburgh, has been organized, capital $50,000, by Paul M. Hittner, 384 Jefferson Drive, Pittsburgh, and W. D. Taylor, 205 Brilliant Avenue, Aspinwall, Pa., to manufacture electric and mechanical doors and other appliances.

Venango Mfg. Co., Franklin, Pa., affiliated with Franklin Railway Supply Co., Franklin, contemplates one-story plant for manufacture of automobile parts and equipment, locomotive parts, etc. Cost over $50,000 with equipment.

Campbell Transportation Co., Pittsburgh, let contract to Marietta Mfg. Co., Point Pleasant, W. Va., for 12 covered steel barges, each 12 ft. long, 10 ft. deep, 5 ft. wide.

Board of Public Education, Administration Building, Pittsburgh, H. W. Cramblet, secretary, asks bids until Feb. 16 for machinery for Knoxville high school; truck for repair shop, etc.

City Controller, City-County Building, Pittsburgh, asks bids until Feb. 15 for metal culvert pipe and materials for safety barrier for Bureau of Engineering.

Erie Railroad Co., Meadville, Pa., has reopened all departments at local shops, following curtailment for several weeks. Full time schedule has been adopted for several divisions. About 4000 men will be employed.

INDIANA

Atlas Mfg. Corpn., Indianapolis, recently organized, has purchased plant at Thirty-fourth Street and Northwestern Avenue, formerly used by Air-More Products, Inc., for manufacture of patented window-locking device, supercharger for automobile service and kindred equipment. Hiram M. Browne is president; William E. MacLaren, vice-president.

Board of Education, Fort Wayne, contemplates installation of manual training equipment in two-story and basement addition to high school on Montgomery Street. Cost over $150,000. Carl J. Carlson, 1260 South Clinton Street, architect and engineer.

Perfect Circle Co., Hagerstown, manufacturer of piston rings, is operating at capacity with full working force. Company sales in 1931 were largest in history of organization, with increase of 24 per cent over 1930.

Lever Brothers Co., 164 Broadway, Cambridge, Mass., manufacturer of soaps, washing powders, etc., has approved plans for addition to works at Hammond, with installation of equipment for refined glycerine division. Extensions will be made in power house and additional machinery installed. Cost over $450,000 with equipment. Stone & Webster Engineering Co., 49 Federal Street, Boston, engineer and contractor.

Lehman Co. of America, Inc., Cannelton, manufacturer of juvenile furniture, plans purchase of motor-driven, ball-bearing double surfacer machine, motor-driven glue jointer and other wood-working equipment for branch plant at Jackson, Miss., where building has been acquired. Edgar A. Lehman in charge.

Big Four Railroad Co., Indianapolis, will resume operations on full production schedule at local locomotive repair shops, with normal force of 1200 men.

DETROIT

Copeland Products, Inc., Mount Clemens, Mich., manufacturer of electric refrigerators, is arranging for increased production, following completion of two extensions, providing about 20 per cent additional floor space.

Consumers Power Co., Jackson, Mich., is arranging fund of $7,135,600 for extensions and improvements in plants and system. About $1,500,000 will be used for transmission and distributing lines in northwestern part of State; $1,312,800 will be used in gas department, including completion of new artificial gas plant at Royal Oak, extensions in gas lines, also new high pressure gas transmission pipe lines.

Perfection Sprinkler Co., Plymouth, Mich., has been organized by Charles H. Bennett, Plymouth, and Alford S. Lyndon, Ann Arbor, Mich., to manufacture sprinkler equipment and devices.

Warner Gear Co., Detroit and Muncie, Ind., subsidiary of Borg-Warner Corpn., Chicago, is increasing production schedules. Employment is being given to 700 men more than working quota 60 days ago.

Detroit Yacht & Motor Boat Basin, Detroit, subsidiary of Gladwin Park Realty Co., Buhl Building, has begun new boat yard and plant at foot of Motor Boat Lane, Detroit River. Several buildings for shop and other service will be erected. Cost about $200,000 with equipment.

Eaton-Erb Foundry Co., Vassar, Mich., a subsidiary of Wilcox-Rich Corpn., 9771 French Road, Detroit, manufacturer of piston rings, valves and other automotive products, has acquired plant and business of Holley Permanent Mold Machine, Inc., Detroit, and gray iron casting and foundry business of Holley Carburetor Co., affiliated interest. Foundry and other shop equipment will be removed to Vassar, where production will be concentrated and expansion carried out. Purchasing organizations are subsidiaries of Eaton Axle & Spring Co., Cleveland.

Detroit Edison Co., 2000 Second Avenue, Detroit, plans installation of additional equipment at power plant on Willis Avenue, including new feed-water treating system. One-story addition will be built to research laboratory near Delray power station and additional equipment installed. Company also plans improvements in power house at Trenton Channel, particularly for disposition of fine ash, a by-product of pulverized coal.

GULF STATES

Guiberson Corpn., Dallas, Tex., manufacturer of oil well machinery and equipment, is arranging new department for commercial production of Diesel motors for aircraft service, including parts and assembling. New division will also manufacture other gasoline engine units.

United States Engineer Office, Galveston, Tex., asks bids until Feb. 25 for construction of one pipe dredge, including hull and house (Circular 144).

American Mfg. Royalties, Inc., Denison, Tex., has been organized with capital of $50,000 to manufacture metal products. W. J. and Jack Turner, Denison, are heads.

City Commission, Jacksonville, Fla., asks bids until Feb. 24 for one-story steel hangar at municipal airport, with annex for shop and reconditioning service. Ernest E. Anders, chairman.

Planters Cotton Oil Co., McGregor, Tex., plans rebuilding portion of oil mill recently destroyed by fire. Loss close to $100,000 with equipment. Company headquarters at Dallas, Tex.

Board of Regents, University of Texas, Austin, Tex., let general contract to Bellows-Maclay Construction Co., Dallas, Tex., for two and four-story engineering building. Cost about $300,000 with equipment. Herbert M. Greene, LaRoche & Dahl, Construction Building, Dallas, architects.

Continental Can Co., 521 North Scott Street, New Orleans, asks bids on general contract until Feb. 16 for three-story plant, 120 x 160 ft., at Harvey, La. Cost about $175,000 with equipment. Favrot & Livaudais, Hibernia Building, New Orleans, architects. Company headquarters at 1 Pershing Square, New York.

United States Potash Co., Roswell, N. M., is considering new refining plant at potash mines near city. Expansion program also includes sinking 1100-ft. shaft and installation of mining machinery. Cost over $100,000 with equipment.

Brance-Krachy, Inc., Houston, Tex., has been organized by J. D. Brance and A. C. Krachy, Houston, to manufacture metal products.

United States Oil Refining Co., Southport, New Orleans, has begun expansion and improvement program at local oil refinery recently acquired from Southport Refining & Export Co. Will modernize all departments, equipping division for production of engine and other processed oils. Storage and distributing departments will be installed. Cost over $100,000 with equipment. F. H. Leahy Engineering Co., 109 Tchoupitoulas Street, New Orleans, engineer.

Diamond Mill & Elevator Co., Sherman, Tex., plans four-story addition to flour mill, to double present capacity. Blending, screening, conveying and other equipment will be installed. Cost over $75,000 with equipment.

ST. LOUIS

Kinloch Brass Casting Co., 2356 Palm Street, St. Louis, let general contract to C. L. Williams Realty Co., 518 South Vandeventer Avenue, for one-story foundry, 59 x 70 ft. William P. McMahon, Buder Building, architect.

State Highway Department, State House, Topeka, Kan., Ira Taylor, engineer of maintenance, will soon take bids on general contract for one-story equipment storage and distributing plant, with automobile service and garage unit, 60 x 140 ft., at Chanute, Kan.

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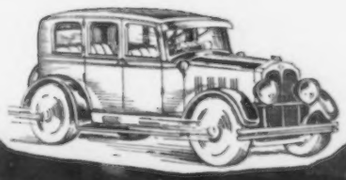

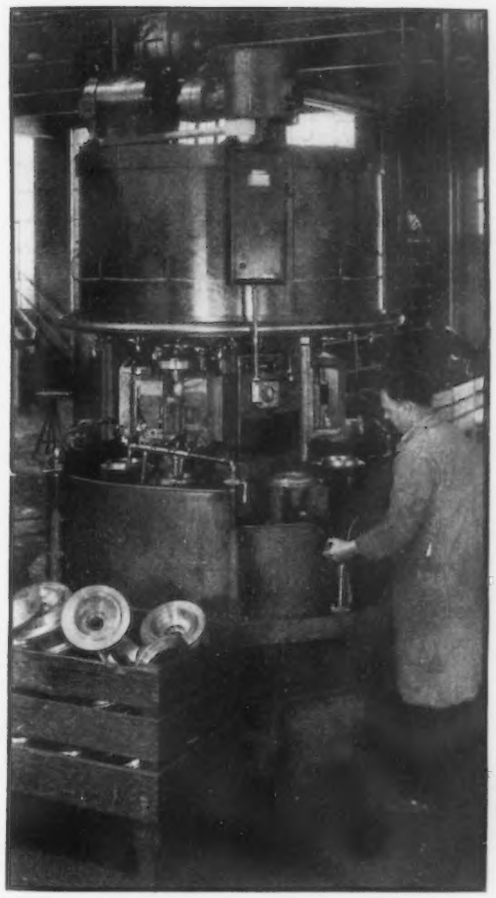

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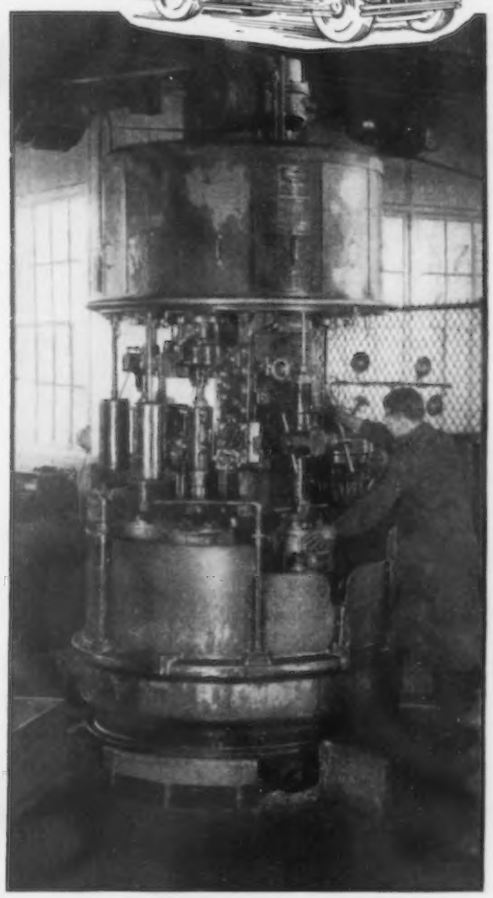

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THE BULLARD COMPANY
Bridgeport Connecticut

Joseph W. Radotinsky, State House, State architect.

Pulaski Mining Co., 2314 Park Avenue, Little Rock, Ark., W. S. Farrell, president, has leased about 50 acres of bauxite property in Pulaski County and plans installation of mining plant, with raw material storage and distributing facilities, loading equipment, etc. Cost over $50,000. Edgar S. Dixon, 615 East Twenty-first Street, Little Rock, secretary.

Bureau of Federal Prisons, Washington, Sanford Bates, superintendent, will soon take bids on general contract for two-story and basement power house at Southwestern Reformatory, El Reno, Okla., with mechanical laundry and shops. Cost about $145,000 with equipment. Hawk & Parr, Hales Building, Oklahoma City, Okla., architects.

State Board of Affairs, Capitol Building, Oklahoma City, has plans for one-story equipment storage and distributing plant, with shop units, 100 x 220 ft., for State Highway Department. Cost about $70,000 with equipment. C. L. Wilson, Capitol Building, State engineer.

Sieloff Packing Co., Newstead and Natural Bridge Avenues, St. Louis, meat packer, will take bids this month for three-story addition, 80 x 175 ft., including improvements in present plant, and one-story condenser building, 35 x 80 ft. Cost about $75,000 with equipment. Wedemeyer & Nelson, Wainwright Building, architects; Bonnell & Thotz Co., 1515 North Grand Boulevard, associate architects.

State Board of Control, Capitol Building, Lincoln, Neb., has plans by Meginnis & Schaumberg, Federal Trust Building, architects, for one-story and basement shop, 50 x 120 ft., at boys' reformatory, Lincoln, for automobile license plate manufacture. O. R. Shatto, secretary.

PACIFIC COAST

Chrysler Corpn., Detroit, has engaged Harry T. Miller, 4814 Loma Vista Street, Los Angeles, architect, to prepare plans for new automobile and motor truck assembling plant on 30-acre tract at Slauson and Eastern Avenues. Initial unit will be one story, 305 x 1100 ft., for truck body and chassis production, passenger car parts and assembling. Two-story administration building will be built. Cost about $2,000,000 with equipment.

Jumbo Plaster & Cement Co., Sigurd, Utah, plans rebuilding portion of plant recently destroyed by fire. Loss over $200,000 with machinery.

Loose-Wiles Biscuit Co., 1100 West Eighth Street, Kansas City, Mo., has asked bids on general contract for first unit of branch plant at Los Angeles, one story, 140 x 220 ft., for storage and distribution, garage and other departments. Plans are being completed for five-story and basement unit, 105 x 270 ft. Entire cost about $1,000,000 with machinery. Claud Beelman, Union Bank Building, Los Angeles, architect.

Thomas Oughton, city purchasing agent, City Hall, Los Angeles, asks bids until Feb. 18 for two heavy-duty gas-driven arc welding outfits.

Coast Appliance & Mfg. Co., Los Angeles, care of Joseph Musgrove, 650 South Spring Street, representative, has been organized by C. W. Grubbs and P. N. Connerton, Los Angeles, capital $100,000, to manufacture mechanical appliances and equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 23 for one tool grinder (Schedule 7404), one vertical drill (Schedule 7422), three turret lathes (Schedule 7398), one expanding and flanging machine (Schedule 7402), one combination angling, mitering, beveling and dadoing saw (Schedule 7421), four turret lathes (Schedule 7406), all motor driven, 10 hand-driven testing generators (Schedule 7407), for Mare Island Navy Yard; four motor driven turret lathes (Schedule 7405) for Puget Sound Navy Yard.

Jerry Caldwell Co., Inc., Seattle, care of J. H. Ballinger, 1209 Hoge Building, representative, has been organized by A. R. Caldwell and associates to manufacture machinery and mechanical appliances.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until March 2 for pumping plant, etc., for naval air station, Sunnyvale, Cal., (Specification 6789). General contract has been let to Barrett & Hilp, 918 Harrison Street, San Francisco, for battery repair and reconditioning plant, acid-mixing plant and power substation at Mare Island Navy Yard at $145,000.

Upland Lemon Growers' Association, Upland, Cal., let general contract to W. J. Nethery & Son, 2259 Main Street, Riverside, Cal., for three-story packing and storage plant, 140 x 200 ft. Cost about $100,000 with equipment. W. W. Ache, 1616 West Fourth Street, Los Angeles, architect.

CANADA

Pressure Pipe Co. of Canada, which is controlled by Canada Iron Foundries, Ltd., and Consolidated Pipe Co., Montreal, was recently incorporated with a capital stock of $500,000. C. L. Jobb, president, states that company will establish a plant at Vancouver, B. C., to cost $75,000.

Sparton of Canada, London, Ont., manufacturer of radios etc., is contemplating manufacture of electric refrigerators. Sparton of Canada is a subsidiary of Sparks Withington Co., Jackson, Mich.

Hudson Essex Motor Co. has awarded contract to the G. H. Emery Construction Co., Dowler Building, Windsor, Ont., for one-story addition at Tilbury, Ont., to cost $20,000.

Robertson Lead Mfg. Co., 6251 Lafontaine Street, Montreal, has awarded general contract to W. H. Madigan, 2165 Clifton Avenue, for one-story plant, 30 x 80 ft.

Machinery Exports and Imports Had Sharp Decline in 1931; December Showed Gain

WASHINGTON, Feb. 5.—**Exports of machinery from the United States in 1931 showed a sharp drop to $318,285,000 from $517,242,000 in 1930, a decline of $198,957,000. The movement was the lowest since 1924, when machinery exports aggregated $317,040,000. December, 1931, shipments, however, rose to $17,686,000 from $14,657,000 in November, a gain of a little more than $3,000,000.**

Foreign shipments of industrial machinery, as classified by the Division of Statistics, Department of Commerce, increased to $8,870,977 from $7,041,260 in November. In 1931 these shipments fell to $142,150,301 from $225,636,508 in the preceding year. Among lines which showed an increased movement in 1931 over 1930 were bending and power presses, forging machinery, rolling machines and "other metal working machinery." Exports of machine tools at $26,549,000 were virtually the same as in 1930 with a total of $26,973,000.

Imports of machinery, as listed in THE IRON AGE table, increased to $890,138 in December from $801,220 in November. For 1931 they showed an abrupt decline to $12,793,142 from $23,119,763 in 1930.

Imports of Machinery into the United States

(By Value)

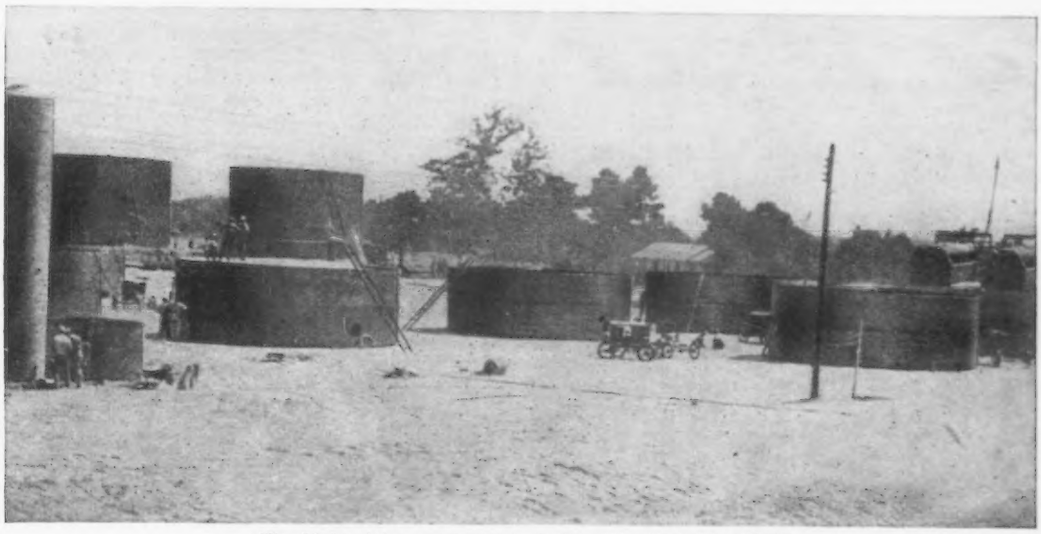
	December		12 Months Ended December	
	1931	1930	1931	1930
Metal-working machine tools	$14,961	$22,367	$268,346	$901,200
Agricultural machinery and implements	119,496	161,860	3,266,002	8,545,336
Electrical machinery and apparatus	291,104	320,757	1,669,638	1,823,133
Other power-generating machinery	11,092	21,929	295,402	549,323
Other machinery	373,602	592,361	4,814,539	8,911,453
Vehicles, except agricultural	79,883	125,816	2,479,215	2,389,318
Total	$890,138	$1,245,090	$12,793,142	$23,119,763

Machinery Exports from the United States

(By Value in Thousands of Dollars)

	December		12 Months Ended December	
	1931	1930	1931	1930
Locomotives	$53	$51	$728	$673
Other steam engines	120	89	306	618
Boilers	10	17	344	1,242
Accessories and parts	67	99	407	867
Automobile engines	89	109	2,371	4,626
Other internal combustion engines	237	425	3,446	7,969
Accessories and parts	109	174	2,124	3,329
Electric locomotives	21	597	609	1,602
Other electric machinery and apparatus	365	648	4,658	10,041
Excavating machinery	206	403	4,042	9,101
Concrete mixers	3	31	251	844
Road-making machinery	64	147	1,232	3,764
Elevators and elevator machinery	199	233	3,537	4,806
Mining and quarrying machinery	516	1,117	10,232	15,784
Oil-well machinery	617	1,298	10,652	23,817
Pumps	258	494	4,373	8,944
Bending and power presses	226	486	5,554	4,619
Forging machinery	170	45	3,984	1,847
Machine tools	1,393	2,129	26,549	26,973
Rolling machines	53	113	2,284	1,187
Other metal-working machinery and parts	389	199	4,003	3,862
Textile machinery	560	536	6,787	8,660
Sewing machines	323	374	3,904	6,771
Shoe machinery	60	116	1,000	1,678
Flour-mill and gristmill machinery	15	49	251	478
Sugar-mill machinery	95	192	2,098	4,316
Paper and pulp mill machinery	90	187	1,276	3,511
Sawmill machinery	22	89	528	758
Other woodworking machinery	37	105	886	1,776
Refrigerating and ice-making machinery	38	291	1,097	4,113
Air compressors	232	282	2,134	5,605
Typewriters	554	1,042	8,835	16,683
Power laundry machinery	24	174	839	1,440
Typesetting machines	159	340	2,334	3,960
Printing presses	198	175	2,116	4,836
Agricultural machinery and implements	8,661	8,929	57,403	115,792
Total	$17,686	$35,339	$318,285	$517,242

Large oil-storage tanks can be successfully welded



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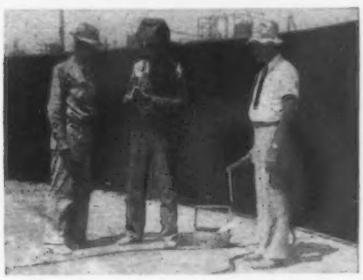

Interior of welded tank in course of construction

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SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

Pig Iron and Structural Shapes Largest Items in 1931 Iron and Steel Imports

WASHINGTON, Feb. 2.—Imports of iron and steel in 1931 fell to 420,260 gross tons from 537,491 tons in the preceding year, and were the lowest since 1921, when they were only 120,578 tons. The low figure for the latter year was accounted for by the post-war readjustment of European producing countries. Imports last December decreased to 25,812 tons from 34,658 tons in November.

Pig iron was the largest item of importation in 1931, totaling 84,454 tons, of which 67,930 tons came from India. The 1931 total, however, showed a sharp decline from the 137,122 tons imported in 1930, of which 108,261 tons came from India.

The largest tonnage in finished steel imported last year was in structural shapes, 71,408 tons, of which 39,063 tons came from Belgium, 17,481 tons from Germany and 12,286 tons from France. Of the 50,063 tons of merchant bars imported last year, 24,337 tons came from Belgium, 11,704 tons from Germany and 8594 tons from France. Reinforcement bar imports were 38,828 tons, of which 26,641 tons came from Belgium, 6807 tons from France and 5164 tons from Germany. Belgium supplied 11,948 tons of the 28,090 tons of hoops and bands imported, while 8538 tons came from Germany and 4981 tons from France.

Coke Production Down Sharply in 1931

WASHINGTON, Feb. 3.—Totaling 33,728,504 net tons, the production of coke in 1931 reflected a decrease of 29.8 per cent from that of 1930, according to preliminary figures prepared by the Bureau of Mines. The by-product output was 32,454,604 tons, the lowest since 1922, when it was 28,550,545 tons. The total 1930 output was 45,195,705 tons. Beehive production in 1931, at 1,273,900 tons, was the lowest shown by records of the bureau, which have been kept since 1913. Stocks of by-product coke at furnaces on Jan. 1 rose to 1,860,000 tons from 1,814,000 tons on Dec. 1.

There were no new by-product coke plants starting operations in 1931. However, three new installations of 93 ovens at existing plants were fired during the year. The Consolidated Gas Co. added 37 Koppers ovens to its equipment at Hunts Point, N. Y., the Hudson Valley Fuel Corpn. fired 31 new Koppers ovens at Troy, N. Y., and 25 Semet-Solvay ovens were added to the plant of the Ironton By-Product Co., Ironton, Ohio. In addition, 295 ovens were completed at four of the existing plants, but not put into operation. No new ovens were under construction at the end of 1931.

Accurate statistics on the recovery of by-products from coke oven operations in 1931 are not yet available. The following preliminary estimates are obtained by assuming that the quantity of by-products recovered during 1931 bore the same relation to the known production of coke in 1931 as in 1930:

Tar	431,646,000 gal.
Ammonia (sulphate equivalent of all forms)	1,103,457,000 lb.
Gas	519,274,000 M. cu. ft.
Crude light oil	128,196,000 gal.

United States Imports of Pig Iron by Countries of Shipment

(In Gross Tons)

	December		12 Months Ended December	
	1931	1930	1931	1930
India	491	13,591	67,930	108,261
United Kingdom	121	95	2,777	14,239
Germany	....	....	202	50
France	....	....	25	....
Netherlands	307	47	7,209	6,243
Sweden	....	49	*1,900	4,183
Norway	2	51	227	*2,610
Canada	....	48	2,711	664
Belgium	....	....	300	669
All others	118	....	1,173	203
Total	1,039	13,881	84,454	137,122

*Revised by Iron and Steel Division, Department of Commerce.

Sources of American Imports of Iron Ore

(In Gross Tons)

	December		12 Months Ended December	
	1931	1930	1931	1930
Chile	22,639	107,283	750,702	1,689,071
Cuba	11,000	....	89,000	190,654
Spain	....	6,500	38,191	81,012
Sweden	....	9,026	83,554	202,748
French Africa	....	7,000	70,472	225,375
Canada	1,040	....	1,624	395
Russia	23,550	31,754	278,612	141,383
Other countries	*31,658	14,357	153,593	253,487
Total	89,887	175,920	1,465,748	2,774,124

*Of this total, 27,635 tons was imported from Norway.

Imports of Iron and Steel Products into the United States

(In Gross Tons)

	December		12 Months Ended December	
	1931	1930	1931	1930
Pig iron	1,039	13,881	84,454	137,122
Sponge iron	....	....	210	
Ferromanganese and spiegeleisen*	917	1,111	25,909	51,595
Ferrochrome†	....	....	96	162
Ferrosilicon‡	8	274	697	4,626
Other ferroalloys	245	....	1,920	687
Scrap	341	1,222	16,274	27,482
Pig iron, ferroalloys and scrap	*2,550*	*16,488*	*129,560*	*221,674*
Steel ingots, blooms, billets, etc.	2,301	1,926	19,927	22,315
Wire rods	662	684	7,114	8,842
Semi-finished steel	*2,963*	*2,610*	*27,041*	*31,157*
Concrete reinforcem't bars	2,030	3,369	38,828	
Hollow bar and drill steel	51	48	1,476	48,364
Merchant steel bars	4,564	3,813	50,063	
Iron bars	33	203	813	1,376
Iron slabs	1	....	41	
Boiler and other plate	22	....	754	1,893
Sheets, skelp and saw plate	235	2,082	16,153	26,594
Tin plate	16	6	195	260
Structural shapes	5,646	5,041	71,408	120,335
Sheet piling	....	....	919	
Rails and rail fastenings	285	198	5,009	8,422
Welded pipe	407	375	7,771	6,382
Other pipe	159	1,502	8,020	15,180
Barbed wire	1,675	377	10,614	4,674
Round iron and steel wire	118	115	2,553	4,234
Flat wire and strip steel	96	41	721	1,098
Wire rope and strand	165	180	1,973	2,596
Other wire	24	35	529	370
Hoops and bands	4,348	1,777	28,090	23,057
Nails, tacks and staples	335	479	8,153	6,013
Bolts, nuts and rivets	5	37	920	348
Other finished steel	3	2	242	64
Rolled and finished steel	*20,218*	*19,680*	*225,245*	*271,260*
Cast iron pipe and fittings	21	1,889	6,642	11,874
Castings and forgings	60	87	1,772	1,526
Total	25,812	40,754	420,260	537,491
Manganese ore*	7,865	28,717	245,317	281,304
Iron ore	89,887	175,920	1,465,748	2,774,124
Magnesite (dead burned)	4,965	3,259	39,241	41,407

*Manganese content only.
†Chromium content only.
‡Silicon content only.